Implementing guidelines and tools to measure socio-economic impact of the dairy sector

(An invitation to a stepwise process)

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Measure impact of the dairy sector

Background

Next steps

DIM prototype

Approach

#LivestockAgenda
Livestock stakeholders are unable to consistently measure the value of livestock to social development.

**RATIONALE**

Little and incomplete information on the number of people that depend on livestock for their livelihoods.

No consistent methodology to assess the socioeconomic benefits derived from livestock activities.

Opportunities that livestock provides to contribute to social development remain untapped.

**INSTITUTIONS**

Livestock Information, Sector Analysis and Policy Branch

Dairy Development Pillar

IFCN Dairy Network

**NEXT STEPS**

Measure impact of the dairy sector

**DIM PROTOTYPE**

Approach

Background
Livestock Agenda

Background

Measure impact of the dairy

The selection of a core set of indicators to measure social impact

Dairy Impact Assessment Model (prototype)

Steps

- Define working and conceptual framework
- Determine basic elements to measure
- Conform a task force group
- The selection of a core set of indicators to measure social impact
- The development of a model to link input and output indicators
- Testing and refining methods / models
Dairy impact analysis approach

What to measure (SCOPE)

- Current contribution of dairy
- What if analysis
- Return on Investment
- Social ROI

Milk production value
Job creation
Income generation

Upstream
Downstream
The Dairy Impact Assessment Model is a Microsoft Excel based tool to assess the social and economic impact of dairy developments in a milkshed / region / country.

The model is available in two tiers:

1. Basic version (data source = user data input)
2. Advanced version (data source = IFCN estimates)

Following figure describes the flow of information:

- Input data
- Calculations
- Outputs

Farm / Country data

Productive, Economic and Social impact assessment

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Input variables

### Dairy Facts
1. Total milk production in the country/region per year
2. Total number of dairy cows/buffaloes in the country/region
3. Total number of dairy farms
4. Total milk delivered in the country/region
5. Total milk equivalents exported in the country/region per year
6. Total milk equivalents imported in the country/region per year
7. Total population in the country/region
8. Total agriculture GDP per year
9. Value added percent share of dairy sector

### Production Value
**Upstream value chain**
10. Milk yield per cow per year
11. Fat
12. Proteins
13. Milk price of formal market (excluding VAT) per kg milk
14. Milk price of informal market for farm
15. Cattle returns (including other returns) per kg milk
16. Coupled Subsidies
17. Total decoupled subsidies
18. Other subsidies incl. VAT balance
19. VAT rates on milk at farmgate

**Downstream value chain**
20. Milk consumption per capita
21. Milk retail price in formal sector
22. Milk retail price in informal sector
23. VAT per litre Milk equivalent
24. FOB Milk equivalent price
25. Milk equivalent import price
26. Processing industry subsidy

### Impact on Employment
27. Labour hours per cow per year
28. Standard manhours per full-time job per year
29. Working days per full-time job per year
30. Proxy variable for upstream full-time direct jobs
31. Proxy variable for downstream full-time direct jobs
32. Proxy variable for upstream full-time indirect jobs
33. Proxy variable for downstream full-time indirect jobs
34. Proxy variable for upstream full-time jobs (informal)
35. Proxy variable for down-stream full-time jobs (informal)

### Impact on Farm Income
36. Minimum wage for off farm work
37. Poverty line per capita per day

**Based on Typical Farm Data**
For average farm
38. Number of adult equivalent family members
39. Farm household cash income per year
40. Off farm income per year
41. Return to labour from dairying (incl. subsidies)

For large farm
42. Number of adult equivalent family members
43. Farm household cash income per year
44. Off farm income per year
45. Return to labour from dairying (incl. subsidies)
46. Average wages in the typical average farm
47. Type of production system of average farm

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### Output variables

#### Dairy Impact Assessment GERMANY

<table>
<thead>
<tr>
<th>Dairy Facts</th>
<th>Impact on Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.78 Million Ton Milk Produced</td>
<td>281,364 Full time jobs created</td>
</tr>
<tr>
<td>69 Thousand farms</td>
<td>158,739 Number of farm jobs</td>
</tr>
<tr>
<td>4.2 Million Cows</td>
<td>122,625 Number of up/down-stream jobs</td>
</tr>
<tr>
<td>96% Milk delivered</td>
<td>3 Number of jobs / 1000 litres milk / day</td>
</tr>
<tr>
<td>49.6% Milk exported from production</td>
<td>15 Cows per full time job</td>
</tr>
<tr>
<td>47.7% Milk imported on demand</td>
<td>9 Jobs / million USD sales</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production Value</th>
<th>Impact on Farm Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.936 Million USD Sum of dairy value</td>
<td>80 cows Average farm</td>
</tr>
<tr>
<td>15.679 Million USD On farm value</td>
<td>192% Above Poverty line</td>
</tr>
<tr>
<td>28% of agriculture GDP</td>
<td>62% of Local wages potential</td>
</tr>
<tr>
<td>2.198 Million USD Farm subsidies</td>
<td>500 cows Large farm</td>
</tr>
<tr>
<td>2.373 Million USD Government VAT revenues</td>
<td>622% Above Poverty line</td>
</tr>
<tr>
<td>1.610 Million USD Net trade value</td>
<td>132% of Local wages potential</td>
</tr>
</tbody>
</table>

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# Outputs - Basic dairy facts

## Dairy Impact Assessment: Germany

### Dairy Facts

- **Milk Production**: 36.8 Million Ton (ECM)
- **Number of farms**: 69 Thousands

### Turnover

- **Turnover**: 15.679 Milk Production Value (Million USD/Year)

### Sector Impact

- **28%** of Agriculture GDP

### Milk Deliveries

- **96%** To formal markets

## Income

### Number of cows

- 4 Million cows

### Employment

- 281.364 Total jobs created (direct-indirect)

### Production / cow

- 8038 Litres cow / year

### Income Impact

- Monthly Income comparison (USD/month)
 Outputs - Basic dairy facts

### Dairy Impact Assessment: Netherlands

#### Dairy Facts

- **Milk Production**
  - 16.0 Million Ton (ECM)
- **Number of farms**
  - 18 Thousands
- **Turnover**
  - 6.214 Million USD/year

#### Income

- **Production / cow**
  - 8892 Litres cow/year
- **Number of cows**
  - 2 Million cows
- **Total jobs created**
  - 91.255 (direct-indirect)
- **Milk Deliveries**
  - 97 To formal markets

#### Sector Impact

- **25%** of Agriculture GDP

#### Monthly Income Comparison (USD/month)

<table>
<thead>
<tr>
<th>Poverty Line</th>
<th>National Minimum Wage</th>
<th>Dairy Return to labour</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>3000</td>
<td>4000</td>
<td>5000</td>
</tr>
</tbody>
</table>

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### Dairy Impact Assessment: USA

#### Dairy Facts

<table>
<thead>
<tr>
<th>Milk Production</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>92.3 Million Ton (ECM)</td>
<td>41.233 Million USD/year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of farms</th>
<th>Sector Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>46 Thousands</td>
<td>13% of Agriculture GDP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production / cow</th>
<th>Milk Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>10330 Litres cow / year</td>
<td>100 To formal markets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of cows</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Million cows</td>
<td>1.881.732 Total jobs created (direct-indirect)</td>
</tr>
</tbody>
</table>

#### Income

- **Number of farms**: 46 Thousands
- **Milk Deliveries**: 100 To formal markets
- **Total jobs created (direct-indirect)**: 1.881.732
- **Milk Production Value**: 41.233 Million USD/year
- **Number of cows**: 9 Million cows
Outputs - Basic dairy facts

### Dairy Impact Assessment: China

#### Dairy Facts

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Production</td>
<td>29.7 Million Ton (ECM)</td>
</tr>
<tr>
<td>Number of farms</td>
<td>1.300 Thousands</td>
</tr>
</tbody>
</table>

#### Income

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Production Value</td>
<td>17.009 Million USD/year</td>
</tr>
<tr>
<td>Milk Deliveries</td>
<td>6676 Litres cow/year</td>
</tr>
<tr>
<td>Employment</td>
<td>689.467 Total jobs created</td>
</tr>
<tr>
<td>Number of cows</td>
<td>5 Million cows</td>
</tr>
<tr>
<td>Poverty line</td>
<td>Monthly Income Comparison (USD/month)</td>
</tr>
<tr>
<td>National minimum wage</td>
<td>Dairy return to labour</td>
</tr>
</tbody>
</table>

#### Sector Impact

- 1% of Agriculture GDP
- 77 To formal markets

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### Outputs - Basic dairy facts

**Dairy Impact Assessment: Bangladesh**

**Dairy Facts**

- **Milk Production**: 3.9 Million Ton (ECM)
- **Number of farms**: 1.432 Thousands

**Turnover**

- **Milk Production Value**: 322 (Million USD/year)

**Sector Impact**

- **5%** of Agriculture GDP

**Employment**

- **1.976.539** total jobs created (direct-indirect)

**Production / cow**

- **902** Litres cow/year

**Milk Deliveries**

- **10** To formal markets

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**Number of cows**

- **4 Million cows**

**Farm Income Impact**

- Monthly Income Comparison (USD/month)

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## Basic structure

<table>
<thead>
<tr>
<th>Areas</th>
<th>Indicators</th>
<th>Formulas to calculate indicators</th>
<th>Variables used in the formulas</th>
<th>Source of collection</th>
<th>Level of accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk collection facts</td>
<td>Indicator 1</td>
<td>Formula 1</td>
<td>Variable 1</td>
<td></td>
<td>High Medium Low</td>
</tr>
<tr>
<td></td>
<td>Indicator 2</td>
<td>Formula 2</td>
<td>Variable 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicator 3</td>
<td>Formula 3</td>
<td>Variable 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>Indicator 1</td>
<td>Formula 1</td>
<td>Variable 1</td>
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</tr>
<tr>
<td></td>
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<td>Formula 3</td>
<td>Variable 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turnover income</td>
<td>Indicator 1</td>
<td>Formula 1</td>
<td>Variable 1</td>
<td></td>
<td>High Medium Low</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Indicator 3</td>
<td>Formula 3</td>
<td>Variable 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Basic dairy facts

<table>
<thead>
<tr>
<th>Description</th>
<th>Formulae</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production value</strong></td>
<td><strong>Input</strong></td>
</tr>
<tr>
<td>Milk produced (Million Ton)</td>
<td>( \text{Milk production per cow} \times \text{Cow nos.} )</td>
</tr>
<tr>
<td>Full time jobs created</td>
<td>( \text{Cow nos.} \times \text{Labour hours per cow} / \text{Full Time Equivalent labour} )</td>
</tr>
<tr>
<td>Sum of dairy value</td>
<td>( \text{Farm production value} + \text{Local consumer value added} + \text{VAT Revenues} + \text{Net trade value added} - \text{farm subsidies} - \text{industry subsidies} )</td>
</tr>
<tr>
<td>Number of farm jobs</td>
<td>( \text{Cow nos.} + \text{Buffaloes nos} )</td>
</tr>
<tr>
<td>Million Cows</td>
<td>( \text{Cow nos.} + \text{Buffaloes nos} )</td>
</tr>
<tr>
<td>On farm value</td>
<td>( \text{Milk delivered} \times (\text{Milk price} + \text{Cattle returns} + \text{Subsidies}) )</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td><strong>Input</strong></td>
</tr>
<tr>
<td>Full time jobs created</td>
<td>( \text{Cow nos.} \times \text{Labour hours per cow} / \text{Full Time Equivalent labour} )</td>
</tr>
<tr>
<td>Milk delivered</td>
<td>( \text{Milk delivered} \times (\text{Milk price} + \text{Cattle returns} + \text{Subsidies}) )</td>
</tr>
<tr>
<td>Number of up/down-stream jobs</td>
<td>( \text{Milk delivered} / \text{day} \times (\text{Upstream jobs per litre milk produced per day}) )</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td><strong>Output</strong></td>
</tr>
<tr>
<td>Direct jobs in formal dairy market upstream</td>
<td>( \text{Milk delivered} / \text{day} \times (\text{Upstream jobs per litre milk produced per day}) )</td>
</tr>
<tr>
<td>Farm turnover in formal markets</td>
<td>( \text{Milk delivered} / \text{day} \times (\text{Down-stream jobs per litre milk produced per day}) )</td>
</tr>
<tr>
<td>Milk imported on demand</td>
<td>( \text{Milk delivered} / \text{day} \times (\text{Down-stream indirect jobs per litre milk produced per day}) )</td>
</tr>
<tr>
<td>Indirect jobs in formal dairy market upstream</td>
<td>( \text{Milk delivered} / \text{day} \times (\text{Down-stream indirect jobs per litre milk produced per day}) )</td>
</tr>
</tbody>
</table>
## Data reference

### Impact on Employment

<table>
<thead>
<tr>
<th>Upstream value chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total milk production in the country/ region per year kg</td>
</tr>
<tr>
<td>2. Milk yield per cow per year kg</td>
</tr>
<tr>
<td>3. Total number of dairy farms</td>
</tr>
<tr>
<td>4. Milk price of formal market (excluding VAT) per kg milk USD/ 100kg</td>
</tr>
<tr>
<td>5. Cattle returns (including other returns) per kg milk USD/ 100kg</td>
</tr>
</tbody>
</table>

### Formulae:

- \( \text{Milk price of formal market} = \frac{\text{Total volume of milk produced}}{\text{Total number of cows}} \)
- \( \text{Total volume of milk produced} = \text{Milk price of formal market} \times \text{Total number of cows} \)
- \( \text{Total number of cows} = \frac{\text{Total volume of milk delivered}}{\text{Total milk produced}} \)

### Data source:

- From national statistics like 32 Multiplied by 100kg in Germany
- From national statistics like 3.5% in Germany
- From national statistics like 4.5% in Germany
- From national statistics like 43.5 hours per cow
- From national statistics like 8038 kg per cow per year
- From national statistics like 69,000 dairy farms in Germany
- From national statistics like 32 USD/ 100kg in Germany in 2016
- From national statistics like 7 USD/ 100kg in Germany in 2016
- From national statistics like 7 USD/ 100kg in Germany in 2016
- From national statistics like 32 Million Ton/ year in Germany in 2016
- From national statistics like 2 Million Ton/ year in Germany in 2016
- From national statistics like 0.3-0.50 in Western Europe and 20-50 in South Asia.
- Internal discussion re-shaping basic prototype and elements (Q3)
- Conform a task force group (Q4) - Guidelines
- Basic prototype elements ready to be tested (Q1/2- 2019)
- Testing phase in 3 regions (2019 linked to a project proposal)
- Model adjustments (2019 linked to a project proposal)
- Prototype available (2020 linked to a project proposal)
Thanks

Contact information

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Action Network

Individual picture or text

Livestock for Social Development

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Livestock-Dialogue@fao.org

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