UNECE: Climate change-related statistics and indicators (SEEA) - Roadmaps & success stories in Finland

UNECE Expert Forum on climate change-related statistics
3 - 5 October 2017, FAO, Rome

Director of statistics, Johanna Laiho-Kauranne
Head of research, Statistics Arto Latukka
Senior specialist, Erja Mikkola
Natural Resources Institute Finland (Luke)

Luke works to advance the bioeconomy and the sustainable use of natural resources

Statutory services:
Policy support in bioeconomy based on monitoring and inventory data, official statistics and analysis and special sectorial services such as conservation of genetic resources.

Research through thematic programmes

BioSociety: Regulatory and policy framework as well as socio-economical impacts

Boreal Green Bioeconomy: Innovative value chains and concepts from boreal forests and fields.

Innovative Food System: Value added and consumer driven sustainable food chain concepts for Northern Europe.

Blue Bioeconomy: Water resources as production and service platform for sustainable growth and well-being.

People – Competence – Collaboration – Infrastructure – Platforms
Development of existing Climate Change Related Statistics & Indicators

- International data needs on statistics
  - Kyoto agreement
  - UN, FAO & Eurostat,
  - DG CLIMA, DG ENV, DG AGRI
  - National data needs
- International or national research information needs
  - BioSociety Research focus area in Luke
  - Finnish Invasive Alien Species Portal
- Specific roles between institutes to react on the data needs emerging in their operational areas:

Climate change-related statistics – Drivers
Existing indicators available in Finland on

Statistics:
1. Total primary energy consumption
2. Share of fossil fuels in primary energy consumption
   - share in agriculture;
   share in household energy use for heating
3. Land use/cover change
4. Cattle stock
5. Energy consumption by households / capita
   - share of wood energy in small scale housing

Further specification required for:
4, 5, 6.
Climate change-related statistics - Emissions
Existing indicators available in Finland on

Statistics:
11. GHG emissions from LULUCF
Estimates from Luke research:
12. Total GHG emission of production activities, residence based
   - estimates on agriculture
13. GHG emission intensity of production activities
   - estimates on agriculture
15. Carbon footprint
   - estimate


Climate change-related statistics - Impacts
Existing indicators available in Finland on

Statistics:
16. Mean temperature
17. Change of precipitation pattern
Estimates from Luke research:
18. Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
   - estimated irrigation for agriculture
19. Cumulative number of alien species
   - research forest pathogens and alien species
20. Carbon stock in soil
21. Proportion of land that is degraded over total land area

For the 28. there is currently no political demand, so the information exists only for those farms who would have an insurance for agricultural losses
Climate change-related statistics - Mitigation
Existing indicators available in Finland on

Statistics:
29. Renewable energy share in the total final energy use/consumption
31. Share of energy and transport related taxes as percentage of total taxes and social contributions

Further specification required for:
• 32., 33., 34.

Climate change-related statistics – Adaptation
Existing indicators available in Finland on

36. Change in water use efficiency over time
38. Progress towards sustainable forest management - forest protection
39. Proportion of agricultural area under productive and sustainable agriculture - % under green manure

Further specification required for:
All 35. – 39.
The way forward on the Climate Change Related Statistics & Indicators

- Indicator Service on the Impact of Common Agricultural Policy in EU on national level will be published in English by 2017-2018
  - Contains a specific section on Climate change related indicators specified by the DG AGRI

Suggestions:
Many indicators require specific definitions to be derived, e.g.

Drivers – Cattle stock
- Lifestock units would be comparable and should be used for re-calibration for impact on CC. (Slides 10-11)

Proportion of agricultural area under productive and sustainable agriculture
- This is very difficult to formulate as a comparable indicator, would be a result of modelling simultaneously for environmental, economical and social impacts
- Instead, proportion of organic production can be derived more easily
- Examples on economic, environment and social impacts used given from FLINT project. (Slides 12-14)
- From research into statistical monitoring requires more funding instruments

Greenhouse gas per farm (t of CO2 equivalent)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Farms represented (t)</td>
<td>650</td>
<td>700</td>
<td>750</td>
<td>800</td>
<td>850</td>
<td>900</td>
<td>950</td>
<td>1000</td>
<td>1050</td>
</tr>
<tr>
<td>Farms in sample</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
</tr>
<tr>
<td>Mean</td>
<td>44</td>
<td>45</td>
<td>46</td>
<td>47</td>
<td>48</td>
<td>49</td>
<td>50</td>
<td>51</td>
<td>52</td>
</tr>
<tr>
<td>Size (ha)</td>
<td>122,000</td>
<td>123,200</td>
<td>124,000</td>
<td>125,100</td>
<td>126,200</td>
<td>127,300</td>
<td>128,400</td>
<td>129,500</td>
<td>130,600</td>
</tr>
<tr>
<td>Greenhouse gas emissions of agriculture (tCO2)</td>
<td>102.5</td>
<td>104.4</td>
<td>106.1</td>
<td>107.5</td>
<td>109.3</td>
<td>111.2</td>
<td>113.1</td>
<td>115.0</td>
<td>116.8</td>
</tr>
<tr>
<td>Greenhouse gas (CH4, nitrogen oxides)</td>
<td>114.5</td>
<td>126.8</td>
<td>139.1</td>
<td>151.5</td>
<td>163.9</td>
<td>176.3</td>
<td>188.7</td>
<td>201.1</td>
<td>213.5</td>
</tr>
<tr>
<td>Greenhouse gas (CH4, nitrogen oxides)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Greenhouse gas (N2O, nitrous oxide)</td>
<td>23.8</td>
<td>25.7</td>
<td>27.6</td>
<td>29.5</td>
<td>31.4</td>
<td>33.3</td>
<td>35.2</td>
<td>37.1</td>
<td>39.0</td>
</tr>
<tr>
<td>Greenhouse gas (N2O, nitrous oxide)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Greenhouse gas (CO2, limestone)</td>
<td>13.9</td>
<td>15.8</td>
<td>17.7</td>
<td>19.6</td>
<td>21.5</td>
<td>23.4</td>
<td>25.3</td>
<td>27.2</td>
<td>29.1</td>
</tr>
<tr>
<td>Greenhouse gas (CO2, limestone)</td>
<td>7.6</td>
<td>8.5</td>
<td>9.4</td>
<td>10.3</td>
<td>11.2</td>
<td>12.1</td>
<td>13.0</td>
<td>14.0</td>
<td>14.9</td>
</tr>
<tr>
<td>Greenhouse gas emissions of fuel (tCO2)</td>
<td>379.3</td>
<td>383.4</td>
<td>387.5</td>
<td>391.6</td>
<td>395.7</td>
<td>399.8</td>
<td>403.9</td>
<td>408.0</td>
<td>412.1</td>
</tr>
<tr>
<td>Greenhouse gas emissions of fuel (tCH4)</td>
<td>206.1</td>
<td>208.0</td>
<td>210.9</td>
<td>213.8</td>
<td>216.7</td>
<td>219.6</td>
<td>222.5</td>
<td>225.4</td>
<td>228.3</td>
</tr>
<tr>
<td>Greenhouse gas emissions of energy (tCO2)</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Greenhouse gas emissions of energy (tCH4)</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
<td>15.3</td>
</tr>
</tbody>
</table>

www.luke.fi/economydoctor
Livestock units by livestock type (LU -coefficients)

Livestock unit (LU) calculations

The table gives the coefficients that are used to convert livestock species and classes to a common unit, the Livestock Unit (LU).

<table>
<thead>
<tr>
<th>Version</th>
<th>LU (EC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Converting average number of animals to livestock units is done applying to the number a coefficient related to the category of animal.

- **LU2**: Horses
- **LU3**: Calves for fattening
- **LU4**: Other cattle less than 12 months
- **LU5**: Male cattle 1-24 months
- **LU6**: Female cattle 1-24 months
- **LU7**: Male cattle over 24 months
- **LU8**: Breeding heifers
- **LU9**: Pigs for fattening
- **LU10**: Dairy cows
- **LU11**: Calf of dairy cows
- **LU12**: Other (including suckler) cows
- **LU13**: Reboots (breeding females)
- **LU14**: Goats (breeding females)
- **LU15**: Other goats
- **LU16**: Knees
- **LU17**: Other sheep
- **LU18**: Purfors
- **LU19**: Breeding cows
- **LU20**: Pigs for fattening
- **LU21**: Other pigs
- **LU22**: Turkey (breeders)
- **LU23**: Laying hens
- **LU24**: Other poultry

Source: EU FADN
http://ec.europa.eu/agriculture/rica/reference_en.cfm#bview

Environmental Sustainability Indicators

- **E1**: Greening: Permanent grassland
- **E2**: Greening: Existing/created areas of EFA
- **E3**: Semi-natural farmland areas
- **E4**: Pesticide usage (Pesticide risk score)
- **E5**: Nutrient balance (N, P) (farm-gate balance)
- **E6**: Soil organic matter in arable land
- **E7**: Indirect energy usage
- **E8**: Direct energy usage
- **E9**: On-farm RE production
- **E10**: Farm management to reduce nitrate leaching
- **E11**: Farm management to reduce soil erosion
- **E12**: Use of Legumes
- **E13**: GHG emissions per product
- **E14**: GHG emissions per ha
- **E15**: Carbon sequestration in FADN
- **E16**: Water usage and storage
- **E17**: Irrigation practices

**ECONOMIC/INNOVATIVE**

- **EI 1: Innovation (CIS)**
- **EI 2: PRODUCING UNDER A LABEL or BRAND**
- **EI 3: TYPES OF MARKET OUTLET**
- **EI 4: Past/Future duration in farming (Survival propensity)**
- **EI 5: Efficiency field parcel (LPIS)**
- **EI 6: Modernisation of the farm Investment**
- **EI 7: Insurance (events outside control of farm) - also to include personal (disability) & farm (building structure) insurance**
- **EI 8: Share of output under contract with fixed price delivery contracts**
- **EI 9: Risk exposure (non-agricultural activities)**


---

**Social Sustainability**

- **S1: Advisory services provided to the farm**
- **S2: Education and training**
- **S3: Ownership/management**
- **S4: Social engagement/participation**
- **S5: Employment and working conditions**
- **S6: Quality of life/Decision Making**
- **S7: Social diversification: improving the image of farmers/agriculture in local communities**

Thank you!

Looking forward to your comments and suggestions

Johanna Laiho-Kauranne, Director of statistics
Arto Latukka, FADN & Economy doctor
Erja Mikkola, Statistical information services

Forename.surname@luke.fi