Climate road map

A roadmap to reduce greenhouse gas emissions in Finnish agriculture

Webinar 20 November 2020 – How to achieve carbon neutrality in agriculture and forestry?
- The first national climate roadmaps from Finland - Liisa Pietola, Head of Environmental Affairs, MTK

MTK SLC

Background

International context / UN

- Paris Agreement 2015:
  - Food production should not be threatened by climate actions (Art 2)
  - The reduction of emissions is the first priority and carbon sinks can be utilized when appropriate (Art 5)

- Koronivia Joint Work on Agriculture (KJWA) 2018-2020:
  - Addressing key issues in agriculture
    - adaptation and resilience,
    - soil, water management and integrated systems,
    - nutrient use and manure management,
    - livestock management,
    - socioeconomic and food security dimensions

EU context

- **Green Deal:**
  - Sharp focus on climate and environmental performance
  - EU vision of Climate neutrality by 2050

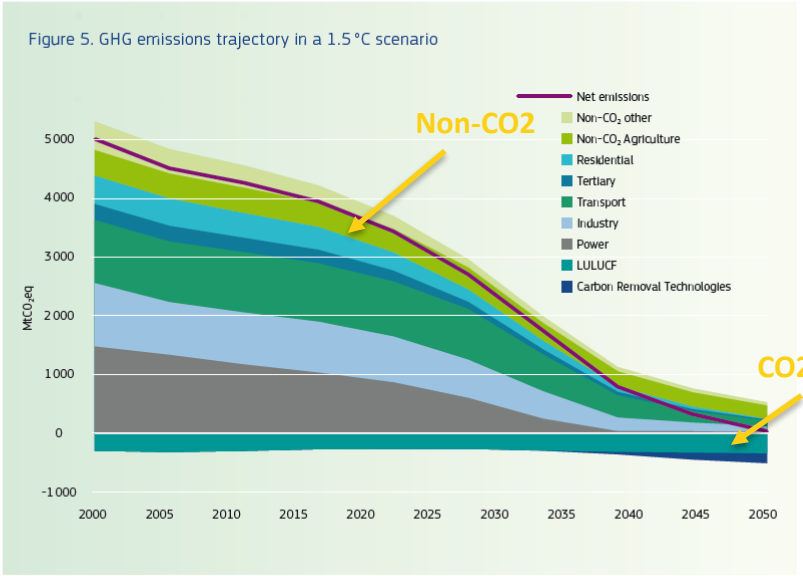
A clean planet for all, the EU's action plan

Climate change is a global threat and Europe cannot combat it alone. Cooperation with partner countries will therefore be essential. However, the EU also has a firm interest in working towards a net-zero GHG economy by 2050 and demonstrating that this can go hand in hand with prosperity, which will encourage other economies to follow.

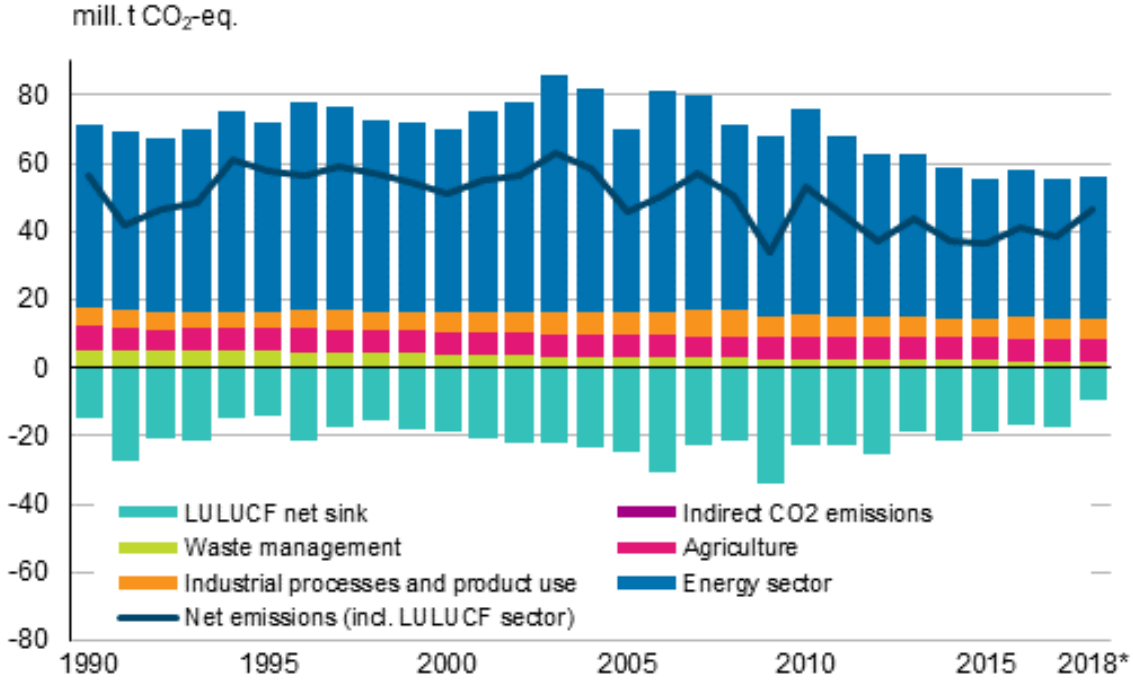
This represents a tremendous opportunity to channel the response to the challenges of the 21st century in a strategic manner. The purpose of this strategic vision is not to set targets, but to create a clear sense of direction.

The European Commission, by presenting this climate-neutral vision, has invited an EU-wide informed debate that should allow the EU to adopt and submit an ambitious strategy by early 2020 to the UNFCCC as requested under the Paris Agreement.

Figure 5. GHG emissions trajectory in a 1.5 °C scenario



Greenhouse gas emissions in Finland



Statistics Finland www.stat.fi

Carbon neutral Finland

- Governmental plan 2019:
  - Finland will achieve carbon neutrality by 2035
  - Reduce the emissions and strengthen the carbon sequestration properties of agricultural land
  - Finland will advance the international 4/1000 initiative to increase carbon sequestration in agriculture
  - Emission reduction measures will be carried out in a way that is fair from a social and regional perspective and that involves all sectors of society.

→ Create sector-specific low-carbon roadmaps that will be brought into line with our new climate actions

MTK and SLC

Central Unions of Agricultural Producers and Forest Owners in Finland

Position

- MTK and SLC are committed to **Paris Agreement**, and support the target of **carbon neutral Finland 2035**, set by the Finnish government
- MTK and SLC will take a **proactive approach** when formulating climate policy in the agricultural sector

Goals

- **Create an ambitious, fair, and reliable climate action plan, which recognizes the special attributes within the Finnish agricultural sector**
- Take initiative in the current climate debate by engaging in a constructive discussion and by actively providing solutions
- Enhance strategic communication in climate affairs by forming a **comprehensive review of possible climate pathways to 2035 and 2050**

Building the road map

Order of the process

- **The Project team** consisted of experts from **MTK and SLC** (Central Union of Swedish-speaking Farmers and Forest Owners in Finland) **= commissioners**
  - Selected points of focus: structural development and food security, technology, productivity
  - Set the initial composition, scale and magnitude of different measures
  - Communicated and coordinated between different shareholders involved in the process

- The Consult team from **National Resources Institute Finland (Luke) = author**
  - Ensured the road map to be scientifically sound and reliable
  - Provided research-based advice on how to approach the topic
  - Responsible for the technical writing process and scenario calculations

- **The Advisory board**: participants from relative organizations and institutions
  - Brought forward views from other sectors of the society
  - Established connection to research organizations, ministries and other interest groups

Building the roadmap

Inclusion

- Members were represented in the Advisory board by regional MTK-organizations
- Opinions were directly collected via an online questionnaire for MTK members, which received 651 answers
- Boards and committees of both MTK and SLC were consulted during the process
- Workshop provided more detailed opinions from broader perspective
  - A wider group of agriculture enterprises, research groups, government officials and NGOs were brought together to discuss possible means

Initial framework

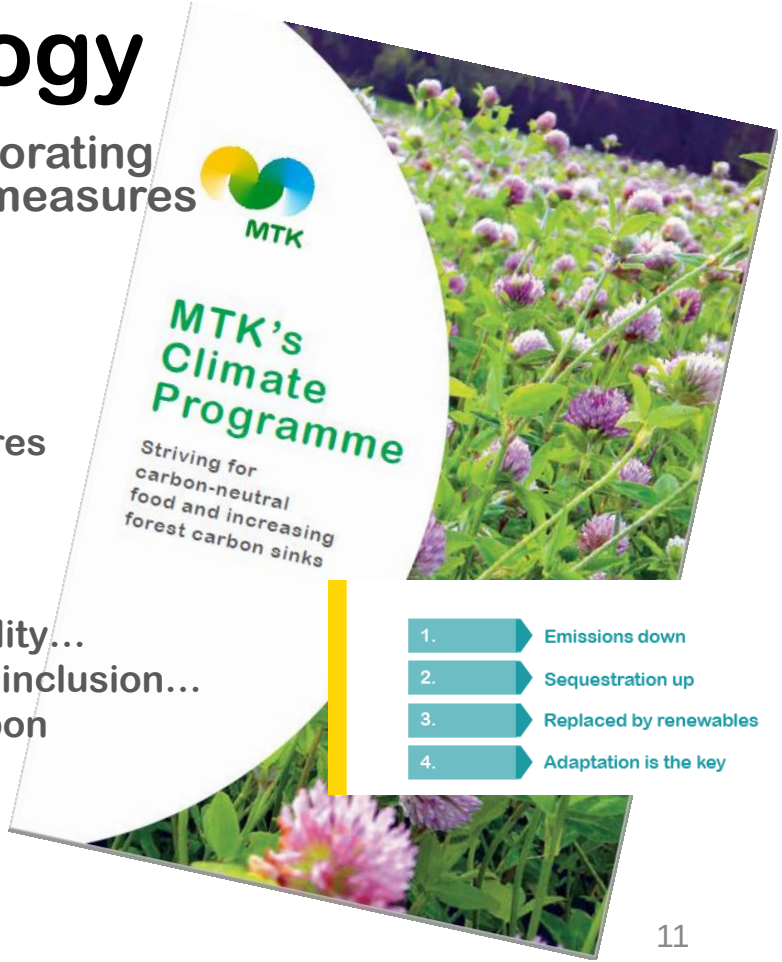
1. No downscaling of production as a means to reduce GHG emissions
   → However, no avoidance of challenging topics
2. Strong policy guidance with voluntary measures
3. Scientifically reliable and up-to-date analysis

Methodology

- **Expand MTK's Climate programme** by elaborating scales, costs and timeframes of different measures to reduce GHG-emissions from agriculture

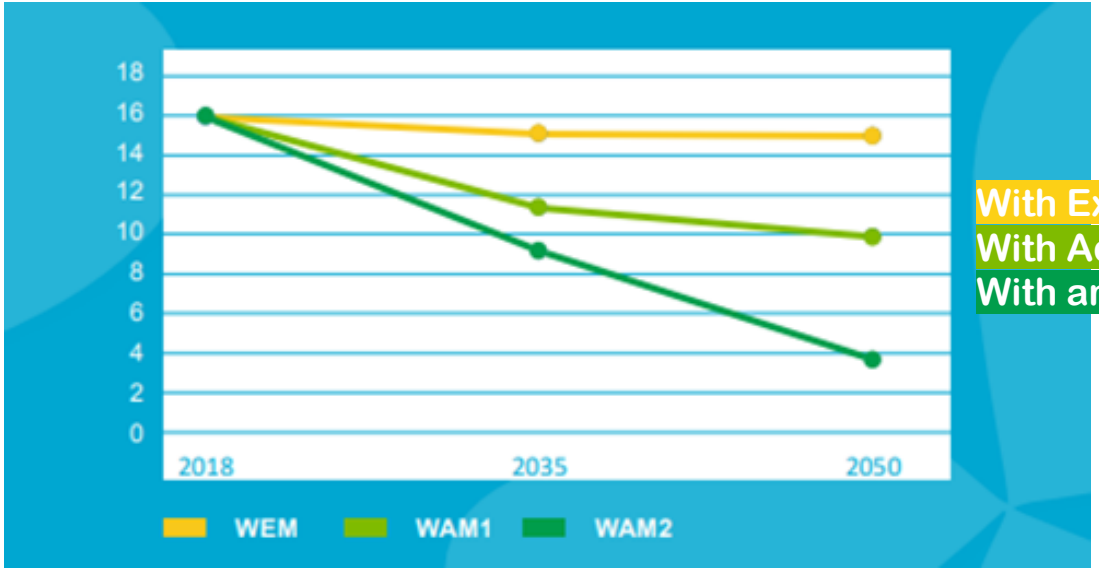
- Forecasting to 2050
  - **No fixed emissions reduction targets**
  - Emphasis on a fair and balanced set of measures
  - Food security at a national level

- Approach based on sustainability
  - **Economic dimension**: CAP, subsidies, profitability…
  - **Social dimension**: acceptability, fair transition, inclusion…
  - **Environmental**: GHG-reductions including carbon sequestration, biodiversity, waterways…



Methodology

→ Scenario analysis by National Resources Institute Finland (LUKE): baseline + 2 climate scenarios



With Existing Methods WEM
With Additional Methods WAM1
With ambitious Additional Methods WAM2

Results

CLIMATE ROADMAP OF AGRICULTURE

A roadmap to reduce greenhouse gas emissions in Finnish agriculture

CLIMATE ROADMAP FOR AGRICULTURE

Climate issues are solved where their impact is the highest.

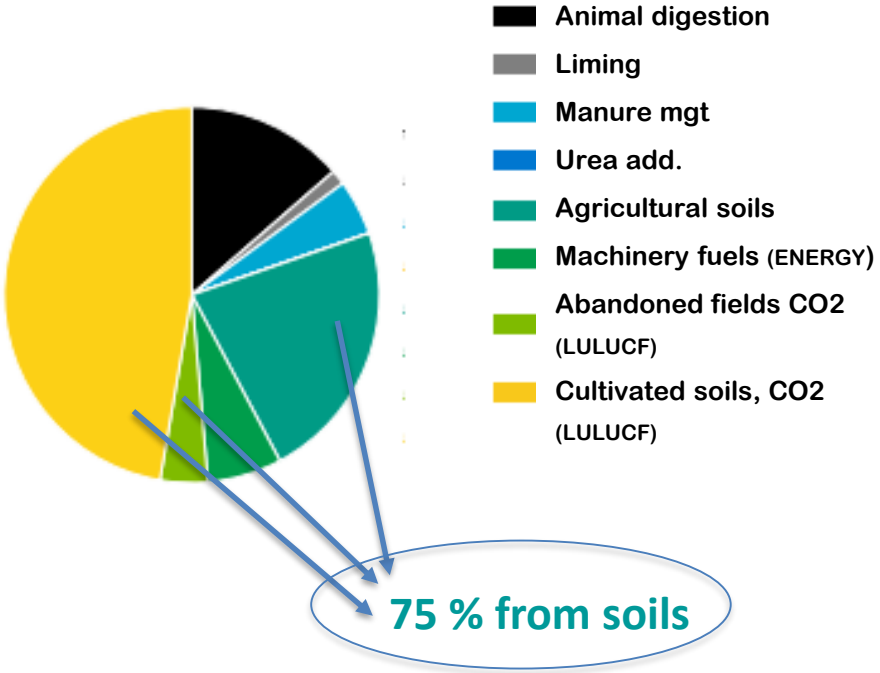
In Finland, 75 percent of agricultural emissions come from the soil.

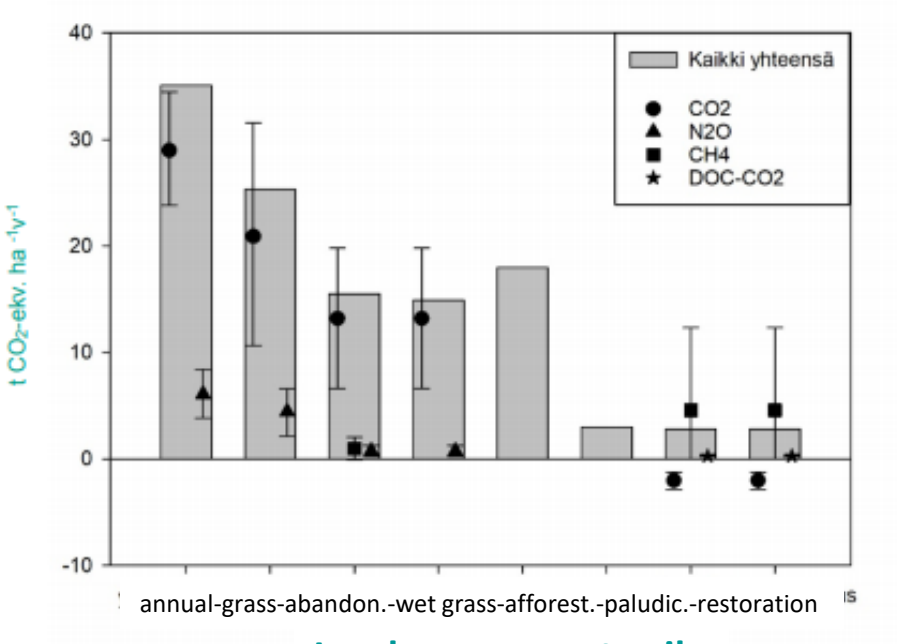
In addition to forestry, agriculture is the only sector that also sequesters carbon dioxide.

Sequestration, along with biogas and renewable energy, helps us to mitigate climate change.

MTK SLC Luke

Emissions from agriculture and related uncertainty





Land use on peat soils

Statistics Finland www.stat.fi

Total emissions of agriculture (non-CO_2 & CO_2) 16 Mt CO2-ekv, > 8 from peat soils

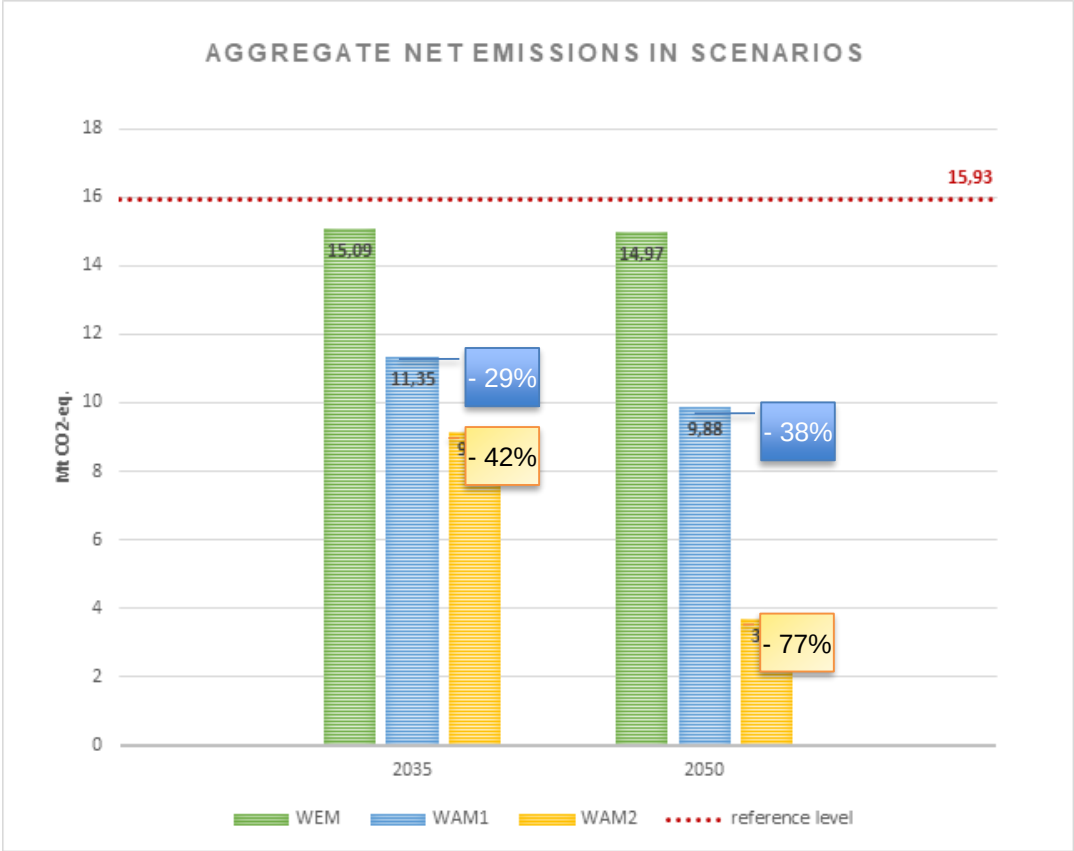
GHG emissions

With Existing Measures,

- Development with current policy instruments and trends
- No tailored incentives and policy instruments are introduced

With Additional Measures (1, 2)

- Enhanced measures, tailored incentives, supportive policy instruments and increased funding
- Ambitious but realistic GHG-emission reduction in WAM1
- New research, materials and methods required in WAM2



Measures in different categories

1. Peat soils

- Tailored and cost-effective measures can be found for low-yielding parcels
- Forerunners should be encouraged through incentives
- Emphasize local and regional role of peat soils
- Decision-making has to be done at farm-level
- Uncertainties need to be addressed

2. Carbon sequestration

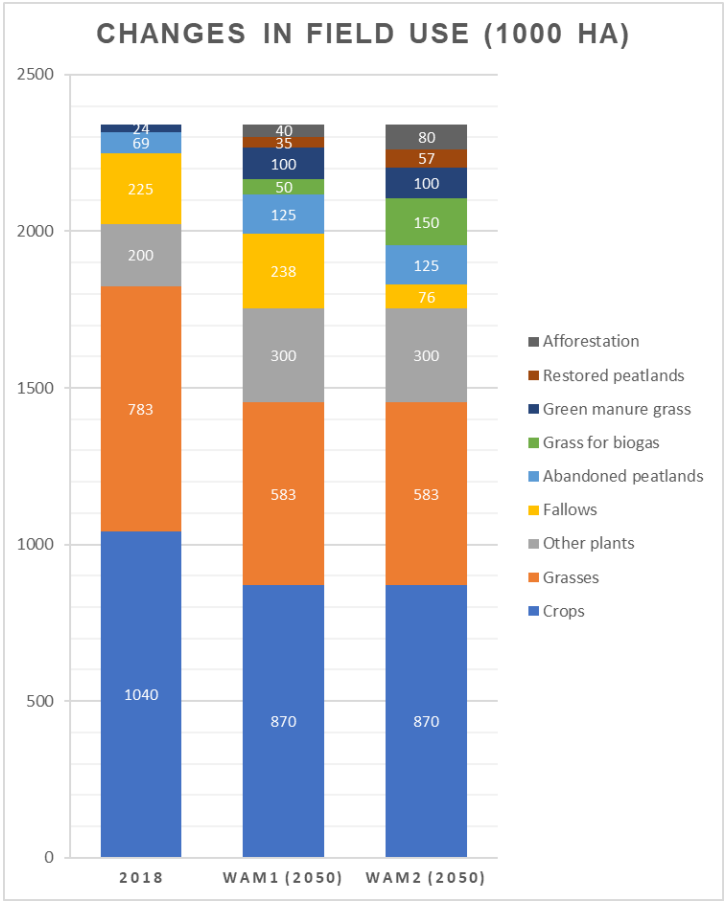
- Mineral soils turned into carbon sinks, as a total, in line with 4 per 1000 initiative
- Improved cultivation methods allow for more sustainable agriculture
- Functioning market-based system for carbon farming supports the effort
- More research is required to find and pilot suitable practices for various soil types

3. Energy solutions

- Biogas substitutes fossil fuels in farms
  - Biomethane can be produced also for the needs of transport sector
  - Improved nutrient cycles reduce the need for fossil fertilizers
- Solar energy applications become widespread
  - 14% of the electricity at farm could be solar power by 2050

Diversified use of fields

- Enhance synergies and positive effects between grass, cattle, energy production and nutrient cycles
  - Finnish agriculture enjoys a good starting setup
- Support further GHG emission reductions via additional means:
  - Measures on low-yielding peatlands
  - Afforestation mainly on mineral soils
  - Increased cultivation of leguminous plants and oilseeds (other plants)
  - More roles for grasses: energy, green manure
  - **Enhance carbon sequestration and emission reductions on arable parcels via improved soil growth conditions** (chemical-biological-physical fertility), cultivation methods and changes in field use by enhanced crop rotation and green cover (catch crops- under sown crops), precision agriculture and new cultivars → technology and productivity



Key conclusions

- Emissions from agriculture can be reduced by -42% by 2035, and by -77 % by 2050 without downscaling of production
- Additional funds of € 3-5 billion are required for WAM1 during 2020-2050
  - Cost for the emission reduction varies between € 6-120 per CO2-ekv.
  - Most cost-efficient GHG-reductions from peatlands
- The farmer has to be incentivized for actively reducing GHG-emissions
  - Forerunners should be encouraged, instead of being punished
  - All measures not possible within the current CAP
  - Enabling voluntary carbon markets as a tool for emission reductions from AFOLU sectors
- All farmers need to feel included in the transition
  - Local level realities need to be carefully accounted when developing policy instruments
  - No magic bullets – balanced and diversified set of measures
- Further research is needed on peat soils and carbon sequestration
- Transition in agriculture requires time and effort

Next step:

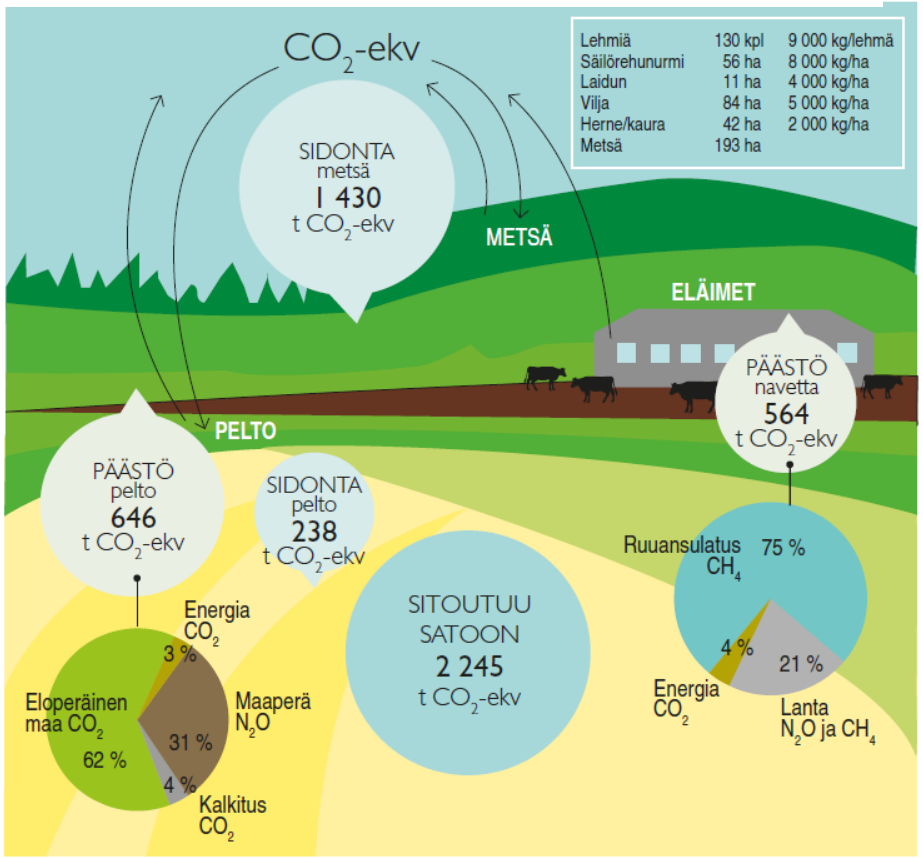
How to calculate carbon-cycles on a farm

Carbon balance / product

→ To produce more biomass by less emissions

→ Need to have soil and plant specific emission factors for a given soil management – currently they are lacking

Carbon cycles on dairy farm – an example of CO2-ekv tons / year



More information

Full report:

https://www.mtk.fi/documents/20143/310288/MTK_Maatalouden_ilmastotiekartta_net.pdf/4c06a97a-c683-1280-65ba-f4666132621f?t=1597055521915

[English abstract, pg. 107-110]

MTK SLC

liisa.pietola@mtk.fi

SUMMARY IN ENGLISH

Finnish agriculture produced a total of about 16 Mt CO_2 eq. greenhouse gas emissions (GHG emissions) 2018. The road to a significant reduction in greenhouse gas emissions requires large-scale measures to reduce emissions from peatlands, increase carbon sequestration in mineral land, and changes in the use and production of energy in agriculture. These changes require new guidance and incentives for farmers, whose main task will continue to be to produce domestic food that meets consumer needs and preferences to about the same extent as in recent years. Efforts are being made to improve the sustainability of agricultural production in all respects, including profitability. The potential of agriculture to reduce greenhouse gas emissions varies widely. The implementation of significant reductions must therefore be carefully planned and implemented in different ways, so that all farmers can apply appropriate measures in cooperation with other farmers and operators.

According to producer organizations, domestic demand for food and agricultural products will not change significantly until 2035. Consumption of red meat, i.e. beef and pork, however, will decrease by about 20% and at the same time the domestic consumption of poultry meat will increase by 20%. Total demand for milk and various dairy products will decrease by about 10-15% by 2035. Domestic production will change at almost the same rate as these changes in demand, although favorable export trends may keep domestic consumption production at a higher level than domestic consumption. Demand for domestically produced legumes for feed and food is growing, as is demand for oats.

In the base scenario (WEM scenario; current policy instruments and trends in agriculture), greenhouse gas emissions will be reduced by only 5% by 2035 (6% by 2050). This means less than 1 Mt CO_2 eq. The base scenario assumes minor changes to the current situation in the agricultural markets and no changes in agricultural land use from 2018, or controls that affect it. Five percent reduction in emissions until 2035 is due to a slow reduction in the number of cattle, with agricultural production and land use largely unchanged.

The WAM scenarios (WAM1 and WAM2) are more ambitious and contain more measures to reduce GHG emissions than the baseline scenario. The WAM scenarios seek further reductions in greenhouse gas emissions from cultivated peatlands, increased carbon sequestration in mineral land and more biogas and solar energy in agriculture. These involve many measures in peatlands, such as less cultivation of annual plants, controlled underground drainage (higher water level than normal, e.g. 30 cm), restoration of peatlands with high water level (0-10 cm) and cultivation of wetlands. High water levels effectively reduce greenhouse gas emissions. In the WAM scenarios, the harvested crop yields will increase by 10% by 2035 and by more than 15% by 2050, especially through new plant varieties and their appropriate cultivation and precise use of production inputs. Higher yields can also be achieved by improving agricultural conditions through more diversified crop rotation and increased soil organic matter. The use of arable land will change significantly in a more diversified direction, as areas under cereals and the low-yielding part of forage grass production will decrease and free up arable land, especially for legumes and oilseeds, grasses used for biogas production, and green manure grasses. As a whole, carbon sequestration in mineral soils is clearly improved. Mineral land will change from the source of greenhouse gas emissions to their sinks in 2035. This will be improved by increasing the cultivation of collection plants and with