The scientific basis of the road map

November 20 2020

Heikki Lehtonen, Research professor
LUKE Natural Resources Institute Finland
https://www.luke.fi/en/henkilosto/heikki-lehtonen/
@heikkilehtonen4
@LukeFinland
#ClimateRoadMap

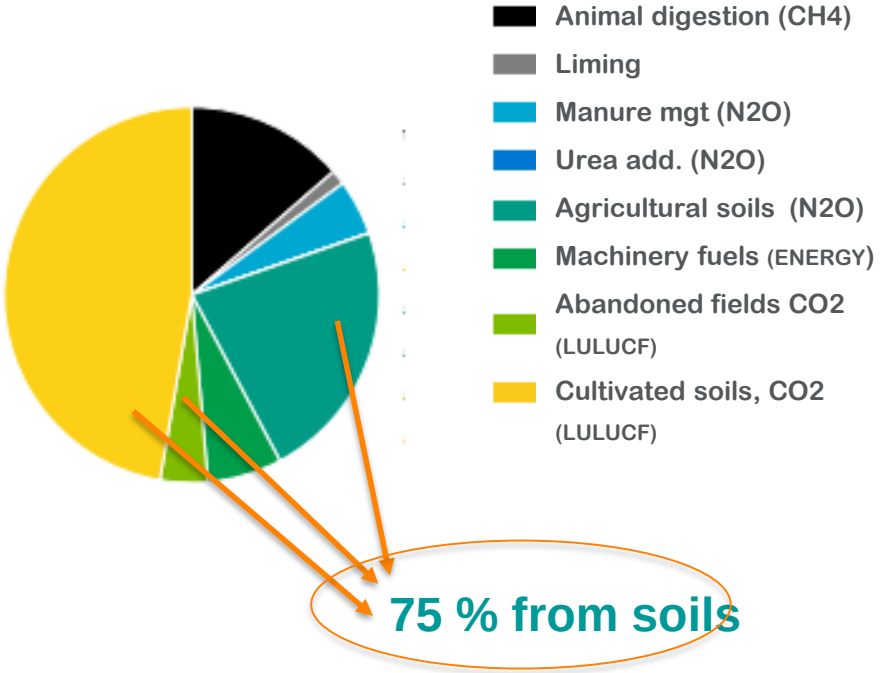
What do we mean by “Scientific basis”?

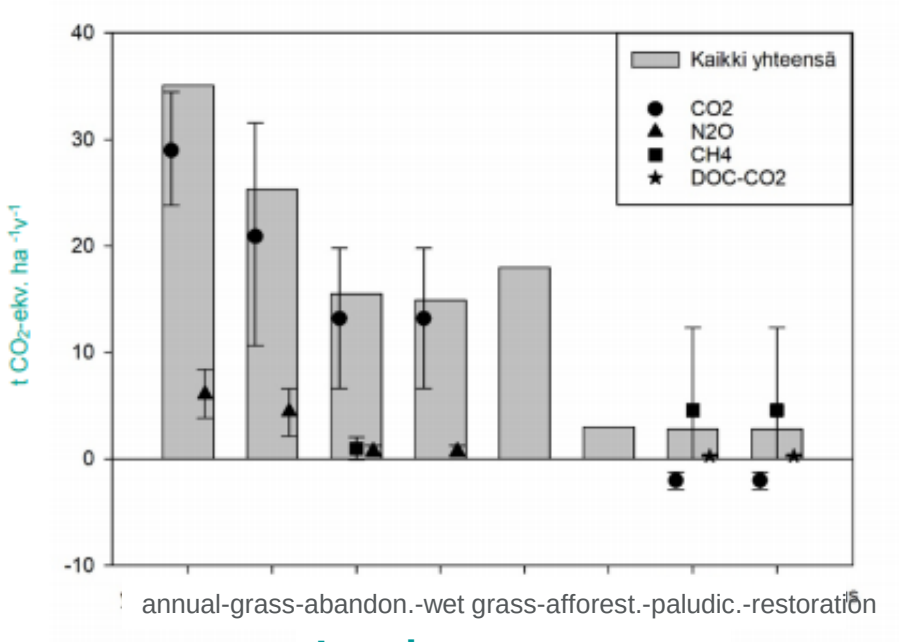
Starting point: Greenhouse gas (GHG) emissions of Finnish agriculture, as reported in: Greenhouse gas emissions in Finland 1990-2018, National Inventory Report under the UNFCCC and the Kyoto Protocol

https://www.stat.fi/static/media/uploads/tup/khkinv/fi_nir_un_2018_2020_04_09.pdf

- The GHG emission calculation in the roadmap follows the current methods and available data (evidence) used in the inventory
- We assume farmers and other actors in the food chain are rational economic agents, utility maximizing, with risk aversion, who consider also other than economic objectives – still economy dominates in decisions
- Competitive markets, competitiveness, cost-effectiveness
- Socio-economic and social dimensions of agriculture are considered
  - Acceptance and feasibility of climate actions – stakeholder interaction

Emissions from agriculture in Finland (16 Mt CO2 eq) and related uncertainty in peatland emissions – food imports excluded





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

Peatlands – 11 % of utilized agricultural land, heterogenous quality

North – 2/3 of agricultural peatlands are located in north-north-west;

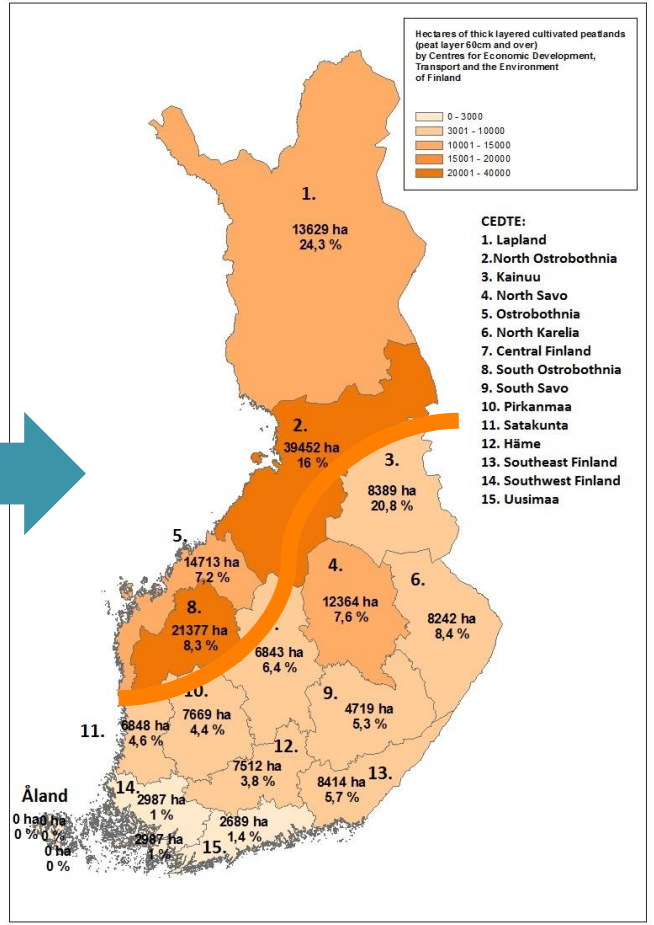
Mostly of high importance in livestock production, (forage grasslands 70-80%) – some peatlands in less productive extensive use

- Climate friendly cultivation techniques: reduced tillage, reduction of anual crops higher water table (drainage solutions)

South- 1/3 of agricultural peatlands are located in south-south-east: Often less important for food production → Shift agricultural production on mineral soils, special measures om peatlands

- Reduced annual crops on peatands (now 50%) higher water table with drainage solutions, paludiculture, restoration, afforestation

- **PROBLEM: Current CAP discourages these actions – New incentives needed**

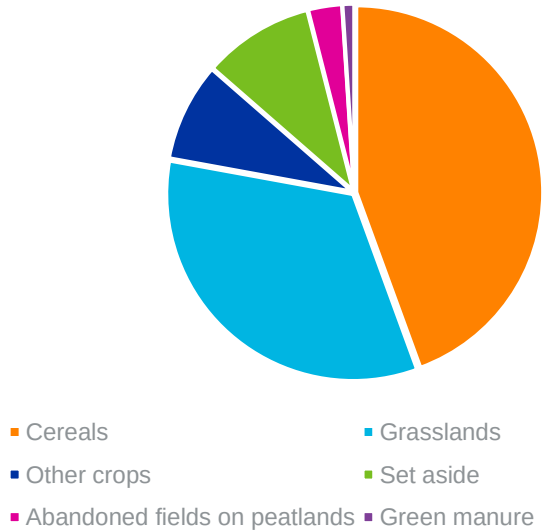


Livestock consumption and production may change – What will happen to land use?

Estimated change in meat and dairy product consumption and production

Consumption	2019	2035	2050
Pork, mill. kg	170	140	140
Poultry meat, mill. Kg	145	175	175
Dairy, million litres	2,262	2	2
Beef, mill kg	106	85	85
Production	2019	2035	2050
Pork, mill. kg	171	140	140
Poultry meat, mill. Kg	139	175	175
Dairy, million litres	2,262	2,15	2-2,15
Beef, mill kg	88	75	70-75

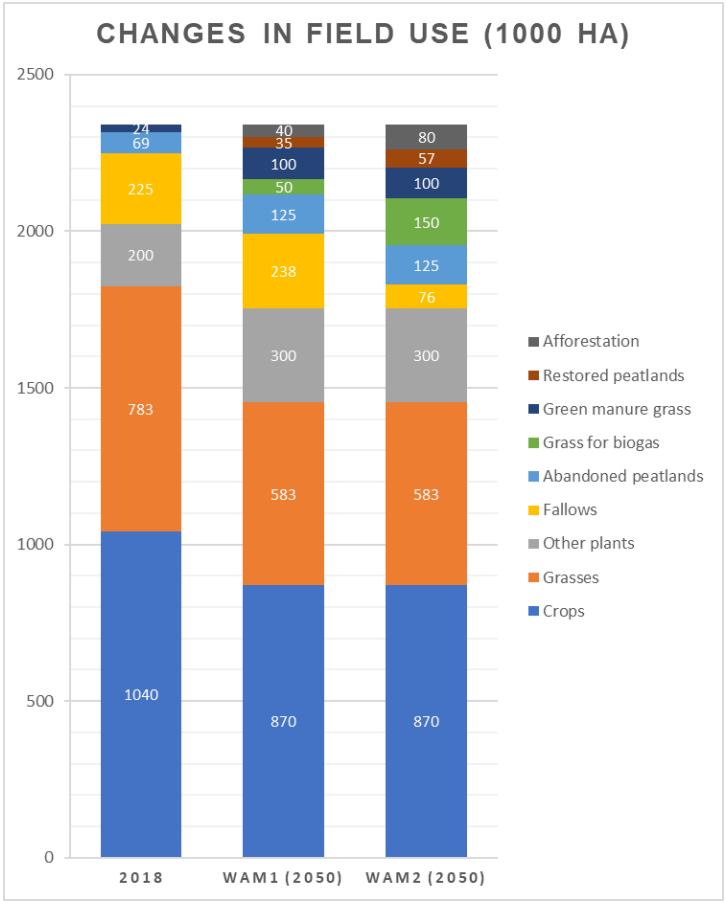
Agricultural land use 2018
Total utilized agricultural land 2.3 Mha



Source: stat.luke.fi (2018, 2019); Climate roadmap, Lehtonen et al. 2020 (reference given in the end of the presentation)

Diversified cropping is in a key role in carbon sequestration

- Enhance synergies and positive effects between grass, cattle, energy production and nutrient cycles
  - Finnish agriculture enjoys a good starting setup: grasslands
- GHG emission reductions via additional means
  - Measures on low-yielding peatlands: wet peatlands, reduced till
  - Afforestation mainly on mineral soils
  - Increased cultivation of leguminous plants, oilseeds, other plants
  - More roles for grasses: energy, green manure, soil structure
  - **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
- **Actions and strategies (of companies) in the food chains are needed – policy may provide some additional incentives, though limited**
  - **New higher yielding cultivars, crop protection, suitable crop rotations; contributing to climate change adaptation**
  - **Precision agriculture, less inputs needed**
  - **Biogas with nutrient recycling, protein feeds/foods**



How can all this be realized?

Development under the scenarios can only take place if viable, profitable and income-enhancing alternatives are made available to a wide range of farms - a matter of common ground for farmers

Different social and cultural impacts in different regions and farm types: What kind of farmers will be affected by the changes? Where? How? Avoid divisionbetween farmers and regions – REGIONAL climate action plans, incl. agriculture, are under development

Challenges in designing and implementing policy measures! Peatlands, carbon sequestration and energy – Current policy systems not sufficient / suitable: New payments /funds /rules?

POSSIBILITY OF GREAT EMISSIONS REDUCTIONS without greatly changing diets and reducing livestock production: -29% (2035); -38% (2050) Climate Scenario 1

In climate scenario 2, large emission reductions (-77%) are partly uncertain / partly already possible IF current and further improvements in C sequestration, higher crop yields, competitiveness in “other crops”, re-wetting peatlands, paludiculture, peatland restoration

Reference

Lehtonen, H., Saarnio, S., Rantala, J., Luostarinen, S., Maanavilja, L., Heikkinen, J., Soini, K., Aakkula, J., Jallinoja, M., Rasi, S., Niemi, J. (2020). Maatalouden ilmastotiekartta – Tiekartta kasvihuonekaasupäästöjen vähentämiseen Suomen maataloudessa. 131 s. ISBN 978-952-9733-54-5. Includes an English abstract (4p.). Maa- ja metsätaloustuottajain Keskusliitto MTK ry. Helsinki. Availabe at: https://www.mtk.fi/ilmastotiekartta; http://urn.fi/URN:NBN:fi-fe2020082161330

Any comments welcome!

heikki.lehtonen@luke.fi

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Thank you!

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