ENVIEVAL

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ADDRESSING CHALLENGES OF EVALUATING RDP IMPACTS ON CLIMATE STABILITY

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WHAT evaluation challenges have been targeted ?

- **Greenhouse Gas emissions is not an impact indicator (yet)**
  - Calculation of Carbon Footprint (CF) at micro level (Italy)
  - GHG emissions with sectoral model at macro level (Finland)
- **Differences between CF and IPCC**
  - CF is based on Life Cycle Analysis, including energy from transport, chemical inputs, NOT accounted in “Agriculture” sector in IPCC
  - CF is a better estimator of total effects of changing farming practices
- **Counterfactual at micro level (IT)**
  - Selection of pairs at process level (Agriconsulting – Regione Emilia Romagna)
  - Attempt to create a CF at farm level (JRC Carbon Calculator)
- **Counterfactual at macro level (FI)**
  - How to deal with lack of non-participants (high uptake of AEMs) ?
  - Use of sectoral model, no need for comparison groups

HOW was the assessment carried out ?

- **Identification of RDP measures**
  - Agrienvironment (sub-)measures (Organic, Integrated and Advanced Integrated account for 70% of the AEM uptakes in Italy)
  - Agrienvironment measures (94% of total arable land under AEM in Finland)
  - Less Favoured Areas (whole country eligible for LFA in Finland, exception: cleared land since 2004 ~2.5% of total UAA)

- **Choice of counterfactual evaluation option**
  - Naive vs. Statistics-based Evaluation options in Italy
  - Multi-regional partial equilibrium modelling (agricultural sector model) in Finland

Estimation of Carbon Footprint (Emilia Romagna IT)

To estimate differences in CO_2 emissions resulting from specific RDP measures (Organic, Integrated and Advanced Integrated Management) compared to conventional farming systems

- **CF cropping systems**
  - **Wheat, Corn, Alfalfa, Pear, Tomato, Vineyard**
  - **LCA Approach**

→ CF in the production process

→ Carbon soil sink

→ N_2O emission from fertilizers

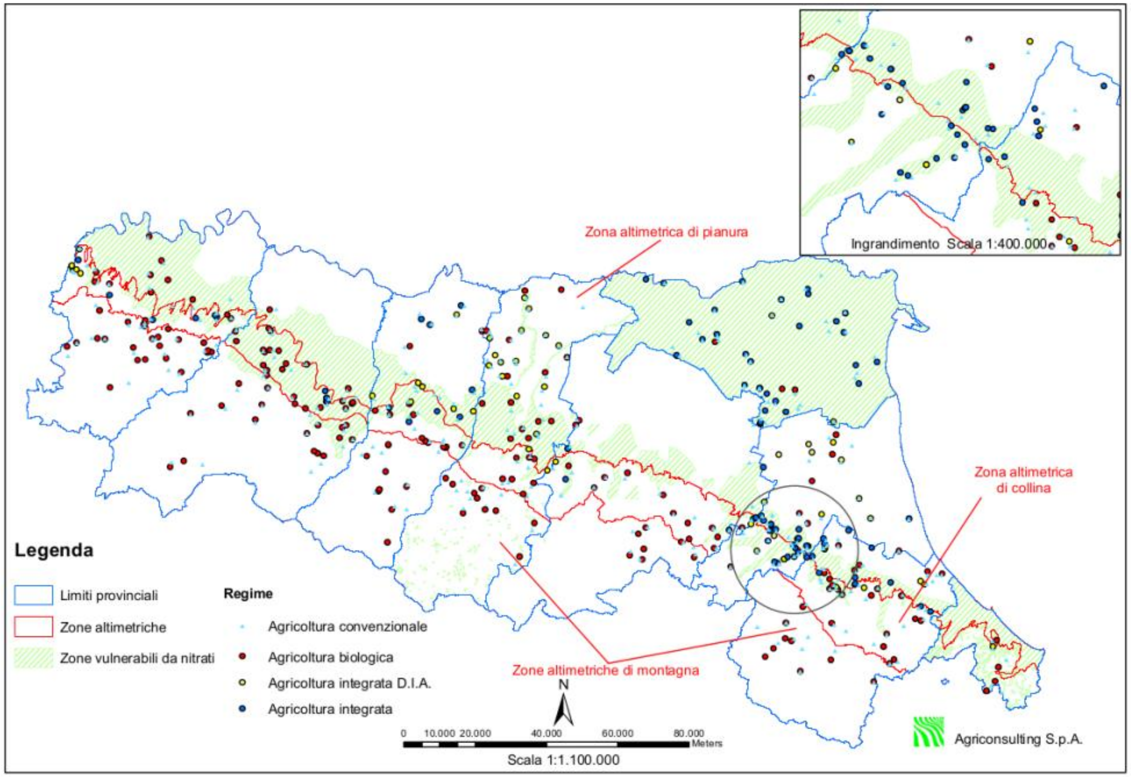
- **CF livestock systems**
  - **Dairy, Beef, Fattening**
  - **LCA Approach**

→ CH_4 emission from enteric fermentation

→ CH_4 and N_2O from manure management

Counterfactual at micro level (IT)

Spatial distribution of farm/parcel sample



Source: Regione Emilia Romagna and Agriconsulting

3-years survey on:
- about 700 farms
- 2.828 combinations of cropping systems (1414 pairs)
- 18 livestock farms

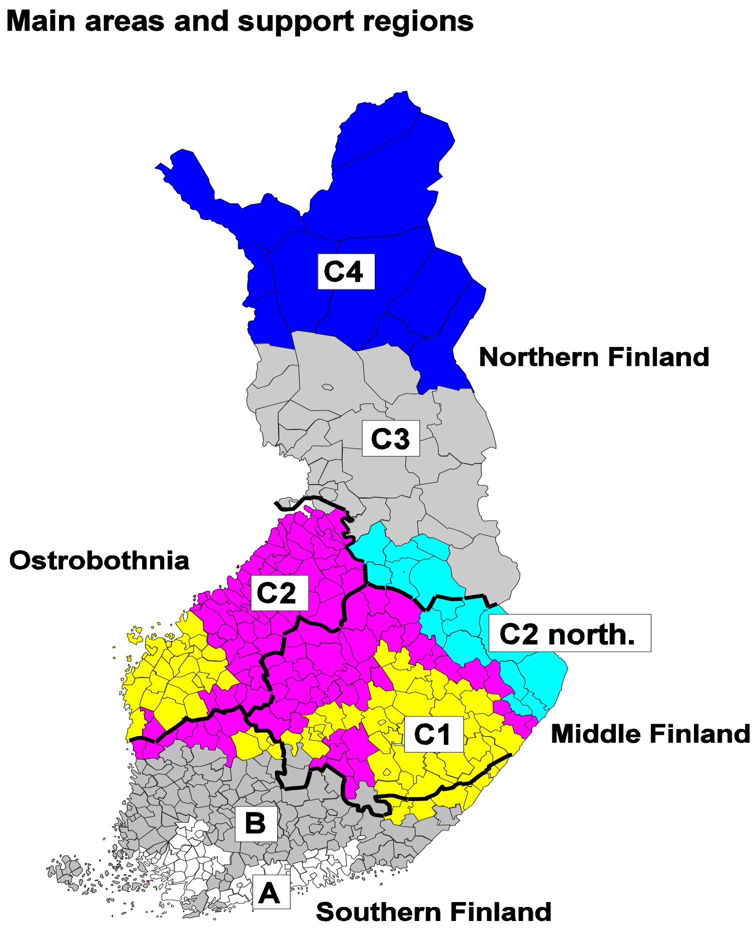
Attempt to create a hierarchical sampling

Multi-purpose survey, used for the assessment of indicators for water and soil quality (joint costs)

DREMFIA model (FI)

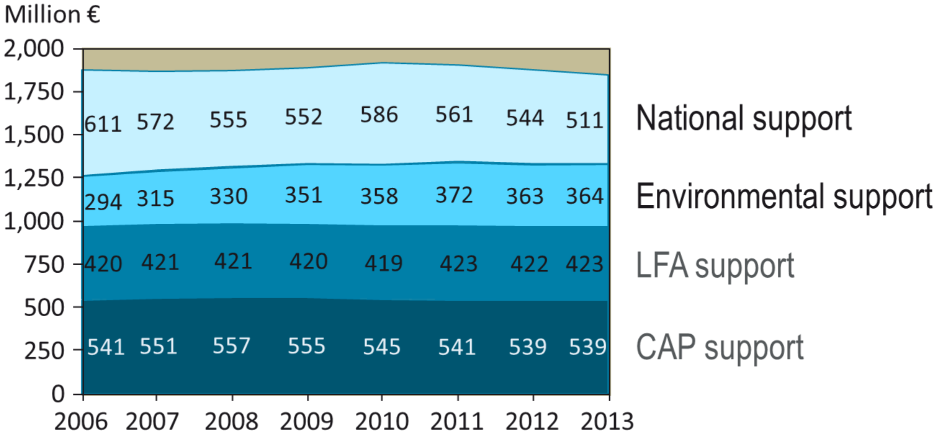
Dynamic multi REgional sector Model for FInnish Agriculture

Simulation of national agricultural production and markets 1995 – 2020



- 17 sub-regions modelled
  - Profit maximizing assumption
- Prices of inputs and outputs affect production decisions
- Handles RDP requirements explicitly
- GHG emissions take into account:
  - Input use
  - Livestock number and type
  - Land use (and changes)

Definition of the counterfactual (FI)



DREMFIA makes it relatively easy to test various alternative counterfactuals

Counterfactual:
Situation *without* AEMs and LFA
= severe effect on ag. production
→ *Decide viable options*

Counterfactual (from 2007 onwards)

1. ”No_pillar2” – replace LFA and AEM with pillar 1 payments
2. ”No_envi” – AEM 118 €/ha removed → farm payments +50 €/ha AND no limits to N&P fertilizer use (Nitrates Directive requirements hold)
3. ”No_LFA” – remove LFA → farm payments +50 €/ha in all of Finland
   Removes prior progressive increase towards North Finland
   Removes increases for livestock producers and harvest obligation

WHAT are the results of the assessment (IT) ?

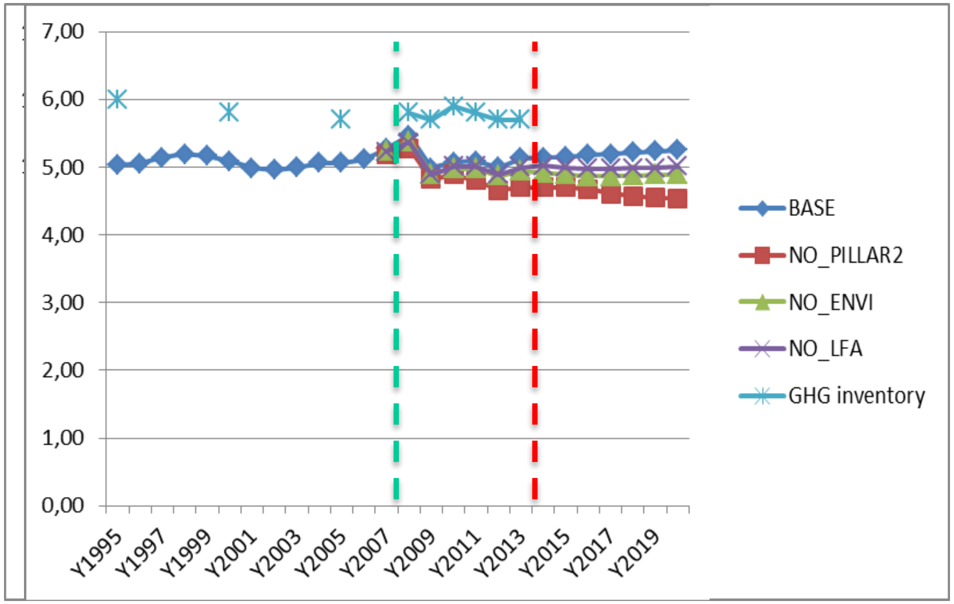
Reduction of GHG emission in comparison to conventional cropping systems

	Production (ton Ceq)	Nitrous Oxide N_2O (ton Ceq)	Carbon sink (ton Ceq)	GHG reduction (ton Ceq)
Integrated Production	1.138	1.857	2.142	5.137
Organic Farming	1.737	1.881	1.610	5.228
Total at regional level	2.875	3.738	3.752	10.365
Total (%)	28%	36%	36%	100%

Source: Regione Emilia Romagna and Agriconsulting

Percentage on Agricultural regional GHG emissions: 0,3%

WHAT are the results of the assessment (FI) ?



Pillar_2 maintains livestock production and land in cultivation

→ +14% impact on GHG emissions

with land use chenges, the overall effect of pillar_2 is +7% on GHG emissions

Total abolishment of pillar 2 ?
Remember, constitutes 1/3 of the total agricultural payments paid

- Land abandonment (more than 1/3 in most regions)
- More significant decrease in livestock production
- GHG emissions and production would decrease drastically

To what extent could the targeted evaluation challenges be addressed?

- **Strengths**
  - Carbon Footprint estimates total GHG emissions based on a well-established procedure (ISO rules)
  - Linkage between micro and macro level based on aggregation of results obtained at micro level
  - Existence of well-established farm sample (e.g. FADN) can be a good starting point for the collection of information
  - Sectoral model: results not dependent on data on non-participants
  - Macro-level results generate auxiliary information
    → Other environmental impacts also estimable (e.g. water quality)
  - Can estimate a number of counterfactuals at macro level
    → Useful for ex post AND ex ante simulations

To what extent could the targeted evaluation challenges be addressed?

- **Weaknesses**
  - Micro level: representativeness of the sample
  - Availability of information on farm practices (additional survey as pre-condition)
  - LCA coefficients have to be tested on field at local level
  - Sectoral model: Assumption of profit maximization (at regional level)
  - Requires continuous updating
  - Accessibility and hidden knowledge (→ not for the average evaluator)

Recommendations: What needs to be considered when using this methods for the ex post evaluation ?

- Appropriate scheduling of monitoring activities:
  - Multipurpose Surveys (role of FADN)
  - End-of-programme Survey as next Start-of-programme Survey
  - Data collection (env. monitoring) suitable for the models
  - Effective data warehouse over the years (decades?)
- Keeping the non-naive counterfactual model requires:
  - Key personnel at work (expertise)
  - Time and effort
  - Co-operation with other parties
- Concentrating the M&E efforts on relevant measures
- Consider the type of counterfactual what you propose
- A good model provides as good answers as the questions are!

Envisaging challenges: new topics for future research

- Calibration of technical coefficients to adapt the methodology to the different local contexts of the Member States
- Harmonisation of CF approach for application on large scale into MS according to standard ISO 14064 and ISO 14067
- Using geomatics systems to improve the quality of the monitoring at both macro / micro level
- Downscaling / Upscaling “biophysical” models at territorial level
- Increasing linkages of statistical (FSS, FADN) and administrative (IACS/LPIS) existing datasets --> Geo-referencing FADN farms
- Improving data collection methods relatively to farming practices into FADN survey and other farm surveys
- Improving model-based evaluation of impacts of specific AEMs at macro level

Thank you for the attention!

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