FarmersandClimate.nl – a farmers network to reduce GHG emissions from farming

Frank Wijnands, Paulien van Asperen & Hilko Ellen, Wageningen UR
Monique Bestman, Louis Bolk Institute
Willem Buter, ZLTO

Background

- Greenhouse gas emissions (GHG) are a serious and worldwide problem
- Agriculture contributes substantially to these emissions, in particular with respect to methane and nitrous oxides.
- Mitigation is crucial and urgent (reduction of emissions)

Objective network

- Accelerate and facilitate development of farms in practice towards energy-neutral and climate-neutral farming, reducing the CO₂ footprint (see below)
- Support and stimulate innovation (R&D, see figure and 4 tracks)
- Create portfolio methods and strategies, ready for dissemination and communication
- Explore options and possibilities climate-friendly agriculture

4 track approach (with key focus)

1. Reduction energy use (direct and indirect) & production of sustainable energy
   - energy use in stables, gasoil use in cultivation and cropping,
   - energy from wind, sun, biomass, (ground source) heat pumps, fermentation etc.
2. Reduction emissions methane and nitrous oxides
   - stable construction and manure handling (animal husbandry)
   - soil management and fertilization (arable crops)
3. Reduction of off farm inputs – emissions
   - optimizing use of external inputs notably fertilizers
   - smart fodder composition and origin (region)
4. CO₂ sequestration in soils and long cyclic (>50 years) biomass
   - optimizing organic matter - and soil management

Many new approaches require careful integration into existing farm practices or modifications of existing routines.

Cradle to gate approach

- Summarizes GHG emissions from off-farm inputs and on farm activities and processes
- Off farm inputs:
  - fertilizers, pesticides, plant material, fodder etc.
- On farm activities and processes
  - CO₂ emission direct energy use
  - NO₂ emission from N inputs in soil and N in soils
  - NO₂ and CH₄ emission from animals and manure
  - CO₂ sequestration in soils and long term biomass & sustainable energy production

CO₂ footprint, energy- and climate neutral farming

- CO₂-footprint = GHG emissions from off-farm inputs and on farm activities and processes minus CO₂ sequestration in soil and production of sustainable energy
- Energy-neutral: Energy use is compensated by production of sustainable energy (on farm or based on rest products of farm). Concept can be applied to stables, storages or whole farm.
- Climate-neutral: CO₂ footprint is zero.

The project

Farmersandclimate.nl is a cooperative effort of 16 farmers (conventional and organic) in arable farming, poultry and pig husbandry, Wageningen UR and Louis Bolk Institute, farmers organizations and business partners, running from 2010-2013. Financed/sponsored by NL Ministry of Agriculture

Impression of CO₂-footprint pig farms (kg CO₂ eq/pigunit)

<table>
<thead>
<tr>
<th>Fodder</th>
<th>Pigs, stable and manure handling</th>
<th>Direct energy use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Impression of CO₂-footprint arable farms (ton CO₂ eq/farm)

above x-axis = emission, below = sequestration or sustainable energy production

Wind energy
Solar energy
CO₂ sequestration
Direct energy
Off farm inputs
Fertilization
Soil - N2O losses

Legend

- Arable crops
- Pigs
- Livestock

Cradle to gate approach

- Summarizes GHG emissions from off-farm inputs and on farm activities and processes
- Off farm inputs:
  - fertilizers, pesticides, plant material, fodder etc.
- On farm activities and processes
  - CO₂ emission direct energy use
  - NO₂ emission from N inputs in soil and N in soils
  - NO₂ and CH₄ emission from animals and manure
  - CO₂ sequestration in soils and long term biomass & sustainable energy production

CO₂ footprint, energy- and climate neutral farming

- CO₂-footprint = GHG emissions from off-farm inputs and on farm activities and processes minus CO₂ sequestration in soil and production of sustainable energy
- Energy-neutral: Energy use is compensated by production of sustainable energy (on farm or based on rest products of farm). Concept can be applied to stables, storages or whole farm.
- Climate-neutral: CO₂ footprint is zero.