Soil Health, Agriculture & Climate in New England – 4p1000 initiative

April 4, 2019

Sylvain Maestracci
Agricultural Counselor

Embassy of France / French Ministry for Agriculture and Food
The 4p1000 initiative in a nutshell

- **4p1000**, an international initiative launched in 2015 during the COP 21,
  - a simple idea: an annual increase of 4‰ of the world soil surface carbon stocks would nearly compensate for the annual CO₂ increase in the atmosphere
  - of course, cannot be done everywhere on Earth, so we need active policies and involvement to promote carbon storage in agricultural area and forests
  - how to do it: combat deforestation, promote agro-ecological practices that increase the quantity of organic matter in soils
  - while mitigating climate change, an increase of organic matter in soils can enhance yields in crops, diminish flood risks, and enhance food security (especially in developing countries)
4p1000 governance and example of practices

- **A light international and multi-stakeholders platform:**
  - All types of stakeholders: Countries and local governments, including France, Canada, Mexico, California, and in Massachusetts: Great Barrington County; farmer associations; Non-profits and NGOs; Research and universities; Companies
  - Governance: a consortium for decision-making (183 members), the forum of all the partners (359) to consult and collaborate with all stakeholders, a scientific and technical committee (14 scientists) to focus on research and provide the best science

- **Examples** of good practices to be promoted

### HOW CAN SOILS STORE MORE CARBON?

The more soil is covered, the richer it will be in organic material and therefore in carbon.

Until now, the combat against global warming has largely focused on the protection and restoration of forests. In addition to forests, we must encourage more plant cover in all its forms.

- Never leave soil bare and work it less, for example by using no-till methods
- Introduce more intermediate crops, more row intercropping and more grass strips
- Add to the hedges at field boundaries and develop agroforestry
- Optimize pasture management – with longer grazing periods, for example
- Restore land in poor condition e.g. the world’s arid and semi-arid regions
- Improve water and fertilizers management and use organic fertilizers and compost
4p1000: Some partners and members in 2018
A set of reference criteria for evaluation for projects & actions –
Criteria, indicators, methods and units

### Soil carbon and land conservation or restauration

<table>
<thead>
<tr>
<th><strong>Agricultural practices</strong></th>
<th><strong>Land conservation</strong></th>
<th><strong>Forestry practices</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanence, Additivity, No leakage</td>
<td>Fraction of area under soil conservation/restoration</td>
<td>Permanence, Additivity, No leakage</td>
</tr>
<tr>
<td>Methodology based on IPCC (Tier 1, 2 or 3)</td>
<td>Methodology based on WOCAT</td>
<td>Methodology based on IPCC (Tier 1, 2 or 3)</td>
</tr>
<tr>
<td>(tonnes C per ha) Depth= 20 cm Duration= 20 yrs or more</td>
<td>(tonnes C per ha) Depth= 20 cm</td>
<td>(tonnes C per ha biomass &amp; soil) 20 yrs or more</td>
</tr>
</tbody>
</table>

### Mitigation

#### N₂O & CH₄
- Any increase in GHG emissions should not be greater than soil C sequestration
- Tier 1 = activity data and default emission factors. Tier 2 = site-specific emission factors. Tier 3 = modeled emissions
- (tonnes CO₂ per ha per yr)

#### Fossil energy
- Any increase in fossil energy use should not be greater than GHG balance improvement
- Same as above
- (tonnes CO₂ per ha per yr)

#### Lifecycle assessment
- e.g. GLEAM (FAO) lifecycle methodologies for livestock and crops
- (kg CO₂e per kg ag. product)

### Safeguards

<table>
<thead>
<tr>
<th><strong>Enhanced land rights</strong></th>
<th><strong>Well being, human rights</strong></th>
<th><strong>Education, training and participation</strong></th>
<th><strong>Ecosystem services</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Access and rights for land and natural resources</td>
<td>Promote positive community relations and awareness of project activities</td>
<td>Improved training, education and participation</td>
<td>Biodiversity &amp; ecosystem services</td>
</tr>
<tr>
<td>(Qualitative)</td>
<td>Free prior and informed consent, health, safety, equity gender, indigenous people</td>
<td>Number and diversity of people</td>
<td>Critical natural habitats, no invasive species introduced, reduced use of toxic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Food security

#### Supply & stability
- Crop & grass yields increased (reduced variability)
- Field surveys compared to control or historical
- (tonnes TM per ha average and inter-annual variability)

#### Access
- Gross margin of ag. production maintained or improved
- Costing methods
- (local price per ton ag. product)

#### Safety & Quality
- Healthy and safe food
- Nutrients deficiencies in production mix
- Health hazards surveys
- Semi-Quantitative

#### Adaptation

<table>
<thead>
<tr>
<th><strong>Yield &amp; animal production stability</strong></th>
<th><strong>Resilience to extreme events</strong></th>
<th><strong>Water resources</strong></th>
<th><strong>Biodiversity</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced variability (yields, dairy/beef production)</td>
<td>Reduced production losses, increased recovery</td>
<td>Water table, stream level compared to historical</td>
<td>Maintained or increased landscape biodiversity</td>
</tr>
<tr>
<td>Time series compared to historical or controls</td>
<td>Surveys, insurance premium, early warning</td>
<td>Relationships between water table, peak discharge and rainfall</td>
<td>Plant species diversity, patrimonial species</td>
</tr>
<tr>
<td>(inter-annual production variability)</td>
<td>(avoiding losses)</td>
<td>(volume of water)</td>
<td>Shannon index, patrimonial species</td>
</tr>
</tbody>
</table>

**MINISTÈRE DE L'AGRICULTURE ET DE L'ALIMENTATION**
Climate change and 4p1000 implementation in France: Agroecology projet

- France has developed a broad strategy to push changes in agriculture toward more sustainable production methods: the **Agroecology projet**

- **Goals**
  - *Systemic approach* at the farm level as well as in its relationship with local ecosystems and local agri-food chains
  - Reliance on *positive interactions in the agricultural ecosystem*: conservation and improvement of natural resources by efficient management of inputs and practices (including enhancement of biodiversity and biological regulations)
  - *Enhancement of economic performance* of the farm including through ecological performance

- **Governance**
  - *Collective governance* of the project with the main stakeholders of the sector
  - Definition and implementation of a *collective and comprehensive action plan* (17 chapters; more than 70 actions)
  - *Modification of other policies* from this new perspective, and articulation with other national strategies: National Low Carbon Strategy, National Biodiversity Strategy
Climate change and 4p1000 implementation in France: programs used

- Alongside the Agroecology project, several programs and policies are engaged in tackling the climate change challenge
  - Programs from the Common Agricultural Policy
    - Cross-compliance as a condition to receive surface payments
    - Green payment scheme: direct payment with ecological conditions
    - Agri-Environment-Climate measures (equivalent of Conservation programs): one measure aimed at healthy soils, measures to maintain and extensively manage grasslands and pastures -
  - Program for Organic farming
  - Legumes plan: promoting planting protein crops (areas decreased in France) to limit fertilizer use and enhance farm autonomy
  - Agroforestry plan: developing agroforestry as an agroecological farm system
  - Research: soil is one of the four priorities of the national “Agriculture and Innovation 2025” Plan
  - Outreach and Training
Climate change and agriculture policy
What’s done in California and Maryland

- In Maryland: Healthy Soils Program
  - Management of nutrients for Chesapeake Bay water quality
  - Program adopted in 2017
  - Healthy soil consortium that meets on a regular basis, with all stakeholders

- In California: Healthy Soils Initiative
  - Launched in 2015
  - For farmers, both incentive programs and demonstration projects
Climate change and 4p1000 implementation for instance, what can be done on a dairy farm?

- **On crops**: transform the parcel into a carbon sink
  - **cover crops**, to have a cover all year round (including permanent pasture)
  - **no till**, or **light tillage**, to avoid disturbance of top soil organic matter
  - Think legumes in crop rotation or planting: less fertilizer (and feed for cows)

- **On animal husbandry**:
  - **manure management**: a good management on parcels can contribute to further increases of carbon storage
  - **Grazing management**: grazing on a limited area, with quick rotations of the herd
  - **Animal feed**, curb the formula used: flaxseed for example reduce GHG emissions

- But first and foremost: **think Organic matter**
Thank you for your attention