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The role of agriculture in soil carbon storage and how to empower farmers

15.04.2020: Sustainable biomass and low-ILUC-risk options in agriculture

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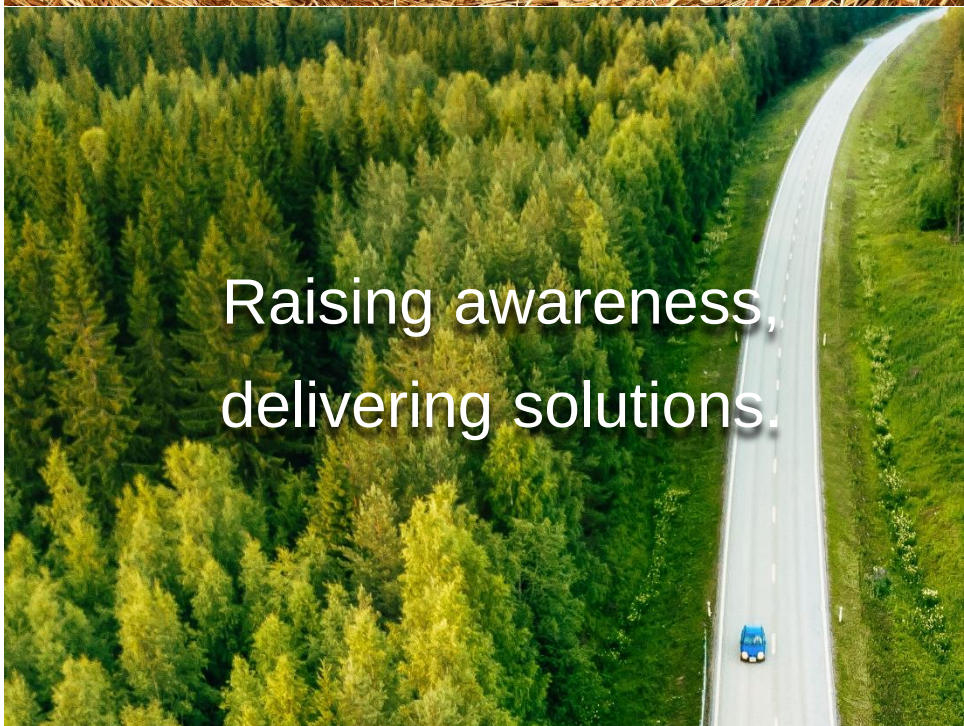

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Soil organic carbon: common denominator to combat climate change

Focus on forests: **1,500 projects covering 12 m hectares**;

Fewer than **60 projects** *(half of them in Australia)* **in croplands, pasture, peatlands or wetlands** are under compliance or voluntary carbon markets, providing under 50,000 t of annual carbon removals globally
(https://go.nature.com/2QHCU3K)

United Nations Framework Convention on Climate Change (UNFCCC)

- 4 per 1000 Initiative (Paris, 2015)
- Formal recognition of SOC sequestration in the UNFCCC process in 2017

United Nations Convention on Combating Desertification (UNCCD)

United Nations Sustainable Development Goals (SDGs)

The **global carbon pool in soils** to a depth of 2 m **is triple that of the atmosphere** (~3,000 Gt C compared to ~830 Gt C).
Sanderman, J., Hengl, T. & Fisk, G. Proc. Natl Acad. Sci. USA 114, 9575–9580 (2017).

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Soil carbon in agriculture = Carbon farming

Carbon farming refers to ecological farming practices that can sequester carbon and/ or reduce GHG emissions.

Agricultural activities for carbon sequestration include conservation tillage, cover cropping and rotational cropping.

Carbon sequestration in agricultural soils can help to improve soil structure and nutrient storing capacity, reduce erosion, increase soil moisture retention and plant available water.

Co-benefits for farmers: improving soil quality, reducing soil erosion, enhancing biodiversity, selling carbon credits, improving landscape appearance and GHG mitigation/carbon storage.

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Ecological farming practices for carbon sequestration & Renewable Energy Directive II

Avoid leaving the soil bear to limit carbon losses	• *Cover crops*
Restore soils	• *Cultivate unused, abandoned or severely degraded land*
Plant species with ability to fix atmospheric nitrogen in the soil	• *Grassy crops:, such as switchgrass, miscanthus, etc.; cover crops*
Use manure & compost to nourish the soil	• *Biogas, biochar*

The role of agriculture: green architecture of CAP post 2020

Specific objectives

- Contributing to climate change mitigation and adaptation, as well as sustainable energy

- Fostering sustainable development and efficient management of natural resources such as water, soil and air

- Contributing to the protection of biodiversity, enhanced ecosystem services and preservation of our habitats and landscapes.

Links to other EU legislation on the environment and climate

- Member States can match overall CAP objectives and national assessment of needs and coordinate with energy & climate (NCEPs) and national Bioeconomy strategies.

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Empower farmers: policy (ecosystem services payments, certification schemes, carbon credits from soil organic carbon projects on degraded land, etc.)

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CAP & REDII

RED II: Cultivate unused, abandoned or severely degraded land

Specific objective	Interventions	Result indicators	Impact indicators
Contribute to climate change mitigation and adaptation, as well as sustainable energy	**Payments for natural constraints and other region-specific constraints (ANC)** **Payments for management commitments (environment, climate, genetic resources, animal welfare)**	**R.12** Adaptation to climate change: Share of agricultural land under commitments to improve climate adaptation **R.14 Carbon storage in soils and biomass:** Share of agricultural land under commitments to reducing emissions, maintaining and/ or enhancing carbon storage (permanent grassland, agricultural land in peatland, forest, etc.) **R.15 Green energy from agriculture and forestry:** Investments in renewable energy production capacity, including bio-based (MW) ….	**I.10** Contribute to climate change mitigation: Reducing GHG emissions from agriculture **I.11 Enhancing carbon sequestration: Increase the soil organic carbon** **I.12 Increase sustainable energy in agriculture: Production of renewable energy from agriculture and forestry**

REDII: crops which benefit from improved agricultural practices

Example of provisions for CAP in France

Development of new crops or intermediary crops (e.g. flax, hemp, miscanthus):

- Development of new crops to answer new markets;
  - Advantages for farmers: crop diversification, longer rotations, new outlets for farmers;
  - French CAP support: specific subsidies for hemp crops (Voluntary Coupled Support).
- Development of intermediary crops;
  - Advantages for farmers: increased production of biomass, combined with environmental benefits due to the soil cover.

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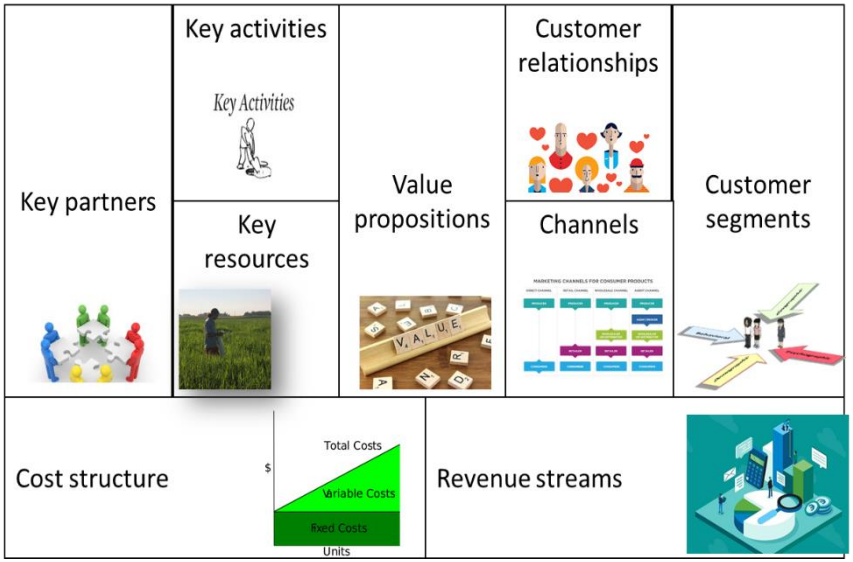
Empower farmers: new business models



Adapted from Ries, E. (2011)

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Farmer-led business structure

"Miscanthus the City of Gembloux : fighting erosion and promoting renewable energy"

- Miscanthus is used for heating of a residence for disabled people.
- Investment of the City of Gembloux: 20 000 €; the City estimates 3 € earned in fuel savings for 1 € invested in plantation.
- Public residence: Fuel bills reduced by 10 000 € to 15 000 € per year 150 tons of Miscanthus avoiding a 60,000 litres fuel consumption → 184 tons of CO2 per year avoided
- Farmers 6 hectares: **± 1350 €/ha of gross margin per hectare and per year**
- **1 hectare of miscanthus = 6000 to 8000 litres of mazout**

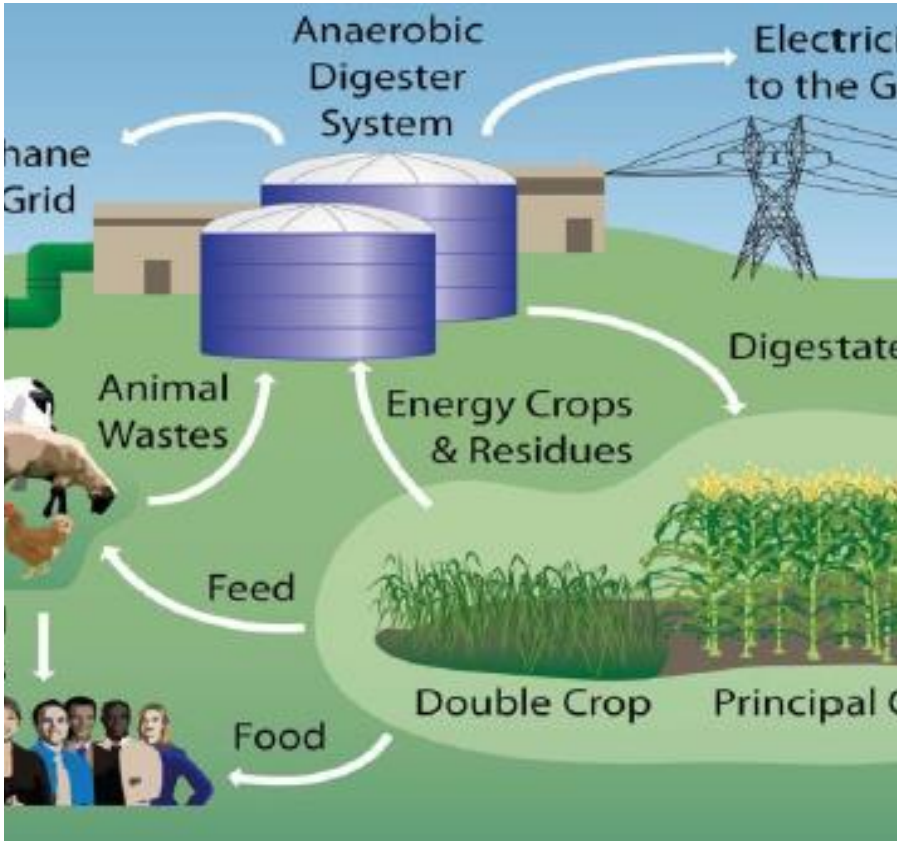
http://www.europeanbioenergyday.eu/miscanthus-a-smart-solution-to-fight-erosion-2/

"Biogasdoneright: circular model and rural synergies "

https://www.bing.com/videos/search?q=biogas+done+right&docid=607992881390160830&mid=86B822A374B9731CB89786B822A374B9731CB897&view=detail&FORM=VIRE

A circular business model, where the biogas plant, when connected with both gas and electricity grids, becomes a small biogas refinery, flexible and decentralized, that produces biomethane, electricity, heat, organic fertilizer.

This integrated production model of production also implies adaptation of some of the agricultural practices (management practices, introduction of winter cropping, and no tillage/strip tillage)



European Commission: Workshop on "Best practices in integrating primary production (farmers and forest owners) in the Bioeconomy (BE) value chains and boosting the development of the Bioeconomy (BE) in rural areas" Brussels, 20 – 21 September 2018

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Additional information on soil research in Europe

http://isqaper-project.eu/

LANDMARK

http://landmark2020.eu/

http://www.soilnavigator.eu/

SoilCare
SOILCARE FOR PROFITABLE AND SUSTAINABLE CROP PRODUCTION IN EUROPE

https://www.soilcare-project.eu/en/

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Thank you

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