New concepts for sustainable management of cultivated soils through direct seeding mulch based cropping (DMC) systems: the CIRAD experience, partnership and networks

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20 years of developing DMC systems for the tropics in Brazil and all around the world
In the humid Tropics, tillage = soil erosion

In the humid Tropics, tillage = rapid SOM mineralization
In the humid Tropics, rapid mineralization of crop residues

First cropping systems in the Cerrados region (Brazil)
The tropical forest ecosystem: a model to reproduce

- A protected soil
- Diversified species able to benefit from restricted resources
- A closed system

The first concept:

To introduce new cover crops as “Nutrient pumps”
New DMC systems in the Cerrados region (Brazil)

The second concept:
To increase the “multi-functionnality” of the cover crops

Multi-functionnality of the cover-crops

Integrating crops and livestock production with DMC
Multi-functionnality of the cover-crops

Total cover = soil protection and weed control
Multi-functionnality of the cover-crops

Strong root system = no compaction and good porosity
Multi-functionnality of the cover-crops

Strong fauna activity
Multi-functionnality of the cover-crops

Function efficiency for some cover-crops
The gradual improvement of DMC performances

Some DMC systems for temperate climate (France)
CIRAD and networking on DMC systems:

- The Action Plan for Agroecology
- The DMC network

An integrated approach proposed by French partners: MAE, AFD, FFEM, CIRAD
**Action plan for Agroecology**

- **Goals:**
  - To adapt D.M.C. systems to different ecosystems and countries
  - To enhance their adoption locally by farmers
  - To prove through RxD projects the technical and environmental interest of those techniques in various contexts (C sequestration)

- **Two components:**
  - Pilot projects in key ecosystems (Tunisia, Cameroon, Mali, Madagascar, Laos)
  - Transversal Program for Monitoring & Support

**CIRAD projects on DMC**

15 projects over 10 countries and 4 continents
A Global Partnership Program under GFAR since 2000

DMC Network

Goals:
- To strengthen the capacity of key stakeholders to develop suitable DMC systems
- To accelerate their wide adoption
- To share experiences through a process of learning and synthesis

Two tools:
- Case studies (Bolivia, Tanzania and Ghana)
- A DMC website
DMC systems: a pertinent tool for sustainable soil management and crop productivity in Tropical environment

Thank You