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Build a decision tree (Using different sources of OM and their considerations...)

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Motivations:

- A general observation is that mean SOC (soil organic carbon) content in agricultural soils decreases.
- A demonstrated fact is that SOC content in soils is an essential key for sustainable agriculture (and other environmental issues...).
- Therefore farmers should build and adopt efficient strategies to enhance SOC.
- For farmers, one of the main problems is to identify and adopt practices adapted to their specific conditions and farm structure.
- Then the question is: "how to built an efficient strategy for my farm?"

- A solution could be to adopt **decision support tools** as **decision tree** to integrate in the decision process:
  - i) Pedological and climatic conditions,
  - ii) Farm specificities,
  - iii) Nature and quality of potential sources of OM,
  - iv) Parameters of strategy efficiency

It would be interesting, a presentation of links to methods for agricultural decision-making provides web resources for further analysis by interested practitioners. (AM)

An example of Decision support tools for agriculture:

http://www.csiro.au/Organisation-Structure/Flagships/Sustainable-Agriculture-Flagship/Decision-support-tools-agri.aspx

**A brief introduction on Decision tree:**

A decision support tool (...) to help identify a strategy most likely to reach a goal.

http://en.wikipedia.org/wiki/Decision_tree

An example of operational decision tree:

"Draft Guidance - Decision Tree for Classification of Agricultural and Nonagricultural Materials for Organic Livestock Production or Handling"

http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5103309
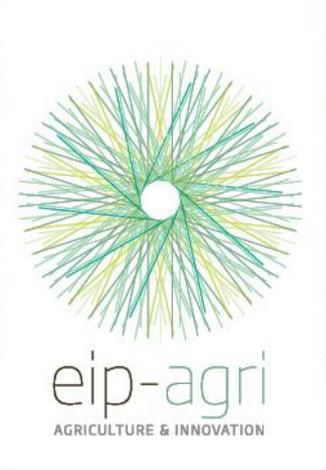
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1. Pedological and climatic conditions

One of the first ideas is that soils are variable in space and time.

The second idea is certainly that all practices intended at increasing SOM are not efficient on all soils.

Then a preliminary step is to know local soil types / properties prior to design a strategy.

It is not possible to produce a soil map for all farms.

The best way to know local conditions is to perform a soil analysis. Farmers experience could pinpoint different zones to be described by soil analyses.

Among important soil properties to consider are: Soil pH, Soil cation exchange capacity, SOM, Soil texture, Soil exchangeable cations, Soil depth, Soil pan, stoniness, waterlogging…

Afterwards, results of this first analysis will constitute with time, potential parameter to judge the efficiency of strategies. (for example the SOC content of the first year could be compared to the SOC content after 3-5 years after the adoption of a new practice)

Here, a French example of soil test paid by farmers to identify their soil characteristics:

http://bdat.gissol.fr/geosol/index.php

http://bdat.gissol.fr/geosol/main.php

For climate, refer to the http://koeppen-geiger.vu-wien.ac.at/

Refer also to local / national meteorological stations.

One idea to integrate is the long-term evolution (as related to global change).

The http://koeppen-geiger.vu-wien.ac.at/ produces a map of climate evolution for coming years.

The climate is essential ……..

2. Farm specificities

Farm specificities are linked to

o   The type of agriculture (livestock, crops, irrigation, etc…),

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(Insert a table with the main SOM sources in relation to the farm activity that can be used)

o   The money available, while all practices do not have the same cost,

(Insert a table with the main SOM sources and their costs)

o   The different sources of SOM (produced by the farm itself or coming from outside).

(Insert a table with the main non-farming SOM sources)

3. Nature and quality of potential sources of OM

Different sources of OM can be used to increase SOM.

BUT, depending on their nature and quality, all sources do not have the same effects on soil properties, and / or cannot be applied on all soils, and / or have the same associated cost.

The simplest way is certainly to re-use the sources produce by the farm itself.

(Insert a table with the main sources and the main associated effects on soils and the main limitations)

4. Parameters of strategy efficiency (performance parameters)

It is useful to judge the efficiency of a strategy with time.

The associated idea is to control if the strategy is well adapted.

If not, it allows to modify the strategy or to define a new one.

(Insert a table with the main performance parameter that can be used to judge the efficiency of a strategy)