French national network devoted to ensure durable recycling of organic residues in agriculture: field experiment network, professional network and shared databases

French national observatory networks: « Réseau PRO » and « SOERE PRO »

SOERE PRO – Research observatory
Network of long-term field experiments dedicated to the study of organic residue (OR) application in agriculture

Scientific partnerships and research objectives
- Long-term sites: with detailed observations which allow the exploration of various agro-pedo-climatic contexts;
- same instruments to monitor hydrodynamic functioning of soil (TDR probes, tensiometers, temperature sensors, lysimeters), climatic data and gas emissions (N₂O, CO₂, gas measurement chambers);
- same analysis on each agrosystem compartments (OR, percolated water, soil, plant); C, N, P, K, S, Ca, Mg, Na; mineral N in soil; crop yields; trace elements; organic contaminants (emerging pollutants, PAH, PCBs); human pathogens; soil physical properties;
- associated sites, including 2 historical sites representing a resiliency context as OR spreading stopped and comparing residues with high contamination levels.

Climatic context: temperate and tropical conditions

SOERE PRO data permit for instance to follow the long-term evolution of the soil properties (see figures below) as related to OR inputs, to estimate field input/output, to develop and adapt models (ex. RothC, Pellet et al., 2010).

The SOERE PRO network is open to Scientists to monitor new measurements and/or to use centralized data for research

RESEARCH PRO – (OR Network) – An operational network
Labelled by CasDar 1 (ADME) funds (2011-2014)
Labelled by Fertilization & Environment and Quasaprove National Technical Consortium (i.e. RMT) (http://www.rmt-fertilisationennvironnement.org, http://www.quasaprove.org)

 Consortium of French professionals involved in organic residues recycling (French research institutes, agricultural institutes, extension services, and agronomy universities)

Finalized and operational tools produced by the OR Network devoted to every actors interesting in studying agricultural recycling effects of OR:
- operational guide to carry out field experiments (including methods per topics: N, C, R, contaminants…), national inventory of field-experiments:
  - data bases
  - national OR referencing method
  - mutualized statistical data exploitation
Up to 450 short and long term field experiments: covering a large diversity of studied OR, agricultural, pedological and climatic contexts, diversity and heterogeneity of data and topics studied

Reasearch PRO objectives, sharing tools between actors
- Harmonized methods devoted to the study of organic residue recycling (practical guide to monitor field-experiments, referencing OR method, statistical methodology to use data: )
- Centralized data acquired in field experiments carried out in France (French OR databases)

To finally evaluate actual benefits and risks associated to the organic residue recycling in agriculture (long-term as well as various short-term specific field experiments) in wider a diversity of agro-pedo-climatic contexts as those ones precisely studied in the SOERE PRO network.

The Réseau PRO network has inventoried up to 450 field-experiments carried out around the French territory (see figure on the right), with more than 50 field-experiments for which data will be centralized and shared between partners.

The Réseau PRO is opened to Professionals and Scientists belonging to the network and more generally working on OR recycling in agriculture, who provide it with precise data about recycled OR effects acquired in field experiments or usual laboratory analyses.

National Organic Residue databases

Same databases are developed to long-term archive data and information coming from the two national OR networks (SOERE PRO and Réseau PRO):
- Field-experiment management information
- Precise referencing of studied OR (origin, composition, raw materials, treatments, storage conditions)
- Soil data (physicochemical properties, N leachates, contaminant(s)
- OR data (physicochemical properties, N mineralization, contaminant(s)
- Plant data (composition [macro and micro-nutrients], yields, contaminants, …)
- Gaz emissions, Hydrodynamic functioning of soil

Data exploitation of both Networks:
- Network statistical exploitation of data, temporary statistical exploitation of data
- Modelling, operational tools (i.e. SYSTAN, AMIG, etc.)

Perspectives
To share guidelines and references gathered on a wide range of organic residues and agricultural, pedological and climatic contexts, to increase considered contents in both networks, to study the actual agronomical value of French OR recycled in agriculture, to communicate and transfer the scientific and technical methodology and data developed in both OR French Network to foreigner partners.