

Appendix A - 4: SOERE PRO Réunion

Site Name	SOERE PRO Réunion – from 2013
Localization	Reunion island, La Mare
Supervisor	Feder Frédéric (Cirad)
Device	Number of treatments: 6 treatments (5 replicates)
	Plot size: $\approx 350\text{m}^2$
	Surface SHON and nature : 1.2 ha
Agro-ecosystem	Sugar cane
Research equipment (SOERE PRO)	On the 4 on-going sites which are included in the ANAEE-France network (QualiAgro, EFELE, PROspective, La Réunion), the same instrumentations are installed to monitor the hydrodynamic functioning of soil: TDR probes, tensiometers, temperature sensors, lysimeters. Gas emissions (N_2O , CO_2) are followed by gas measurement chambers for these sites. Climatic data are monitored on all sites.
Data monitoring (SOERE PRO)	The applied organic residues, soils, crops and waters (rains and leached waters) are sampled and analysed for both site included in the SOERE PRO network (except for the waters which are only sampled in the 4 on-going sites). For each site, samples of organic residues, soil and crops are long-term stored under harmonized conditions to allow future analyses and/or investigations by scientists. The same analyses (parameters, analytical methods, laboratories) are done on samples for the 4 on-going of the SOERE PRO which are included in the ANAEE-France network (QualiAgro, EFELE, PROspective, La Réunion) (see table 1). Data management is centralized at the SOERE PRO level with the development of the information system devoted to Organic residue data (OR SI) for field experiment data, analytical data of organic wastes applied and for traceability information concerning the SOERE PRO samples. Web site: https://si-pro.fr/
Site description	The tropical island of Reunion ($2,512\text{ km}^2$; an estimated population of 850,000) is located in the Indian Ocean, 700 km east of Madagascar (Figure 1). Our study site is located in the Cirad research station of La Mare (60 m above sea level). Annual rainfall is 1800 mm/year and average temperatures are 24°C. Annual hydric deficit for the sugarcane, the dominant culture in this area, is in average 800 mm/year for an expected yield of 100 T/ha of harvested sugarcane. The soils have developed over volcanic rocks (olivine basalts, series of oceanites over 340,000 years BP). They are generally deeper than 1 m and well-drained with a strongly developed polyhedric structure. Its mineralogy is dominated by kaolinite and iron and aluminium oxides. This soil is a Nitisol (IUSS Working Group WRB, 2015) on the base of description and diagnostic criteria. The 1.1 ha of sugarcane field test is divided in 30 plots of 180 m^2 each (Fig. 2). A Mineral Fertilized Control (MFC) and 4 organic treatments are studied with 5 replicates: Sewage Sludge (SS) spread each year or composted and spread once every 4 years during sugarcane plantation (CSS), Pig Slurry (PS) and Poultry Manure (PM) spread each year. Four plots (RMFC1 to RMFC4) are fertilized as the mineral fertilized control plot, 3 out of 4 years and were alternatively used as control plot without fertilization 1 year out of 4. The doses of each OWP applied respect the balance of optimal fertilization; a complementation with mineral fertilizer is usually needed. To assess the impact of sugarcane cultivation, one plot is maintained in bare soil and received on a small surface the 4 organic treatments (SS-BS, CSS-BS, PS-BS and PM-BS) and a control (MFC-BS).

SOERE PRO Réunion



The experimental plan of the SOERE PRO - Réunion field experimentation, thus the distribution of the 30 plots in the field, is given in the figure on the left. It is further divided in 5 blocks of replicates, and each block corresponds to a randomized repetition of the following 6 treatments:

- 1) Sewage sludge (digested, dried and limed sludge), with application every year (**BA**)
- 2) Sewage sludge (digested, dried and limed sludge), with application every 4 years in 2013-2016 and compost of sewage sludge from 2017 (**BR**)
- 3) Sludge of poultry manure, with application every 4 years (**LV**)
- 4) Pig slurry (**LP**)
- 5) no organic amendment (**T**).