Résiliences et adaptations des agricultures. Transition agroécologique et souveraineté alimentaire.

4ème édition de la Conférence Intensification Durable

23 - 25 avril 2024 UCAD (CIGASS), DAKAR, SÉNÉGAL

S2-30

Bayesian modeling to collectively explore pathways of soil carbon sequestration intensification: application to a part of the Senegalese groundnut basin

Broutin Lucas (1,2), Masse D (1), Fallot A (2), Delay E (2)

1: Eco&Sol IRD, CIRAD, INRAE, InstitutAgro, Univ. Montpellier

2: UMR SENS CIRAD, IRD, Univ Montpellier

The present work is part of the project "Dynamics of Soil Carbon Sequestration in Tropical and Temperate farming systems" (DSCATT). The project aims to better understand the mechanisms of soil carbon sequestration, with the goal of contributing to food security and climate action. Project members operate in various locations, including France, Zimbabwe, Kenya, and Senegal. By focusing on the Senegalese groundnut basin and adopting a systemic approach to soil carbon sequestration, we attempted, using a Bayesian model, to correlate a set of social and agricultural practices with soil carbon sequestration dynamics. Bayesian networks are probabilistic graphical models representing conditional dependencies between multiple variables. They are particularly suitable tools for representing complex and uncertain systems and for approaching them through an interdisciplinary approach. The Bayesian network produced in the framework of this project serves several functions. Firstly, it identifies under which conditions - social and agronomic - it is possible to store carbon in soils. The objective is to estimate the consequences of changes in agricultural practices on soil carbon stocks. Constructed with the help of project researchers, the Bayesian network also resembles a synthesis artifact of knowledge. It gathers a set of available knowledge on carbon sequestration in the soils of agro-silvo-pastoral systems in the Sudano-Sahelian regions. It mainly represents the new understanding generated during the project. Thus, it constitutes an original end-of-project support, through which scientific advancements and their articulation can be visualized, and through which new challenges can be identified. Finally, this work, still in progress, is also an opportunity to question the relevance of the construction method and the use of a Bayesian network, structured around agricultural and environmental issues.

Mots clés : bayesien network; soil carbon séquestration; groundnut basin; systemic approach; food security