LET's SEMINAR

Metropolitan **Laboratory of Ecology and Territory** of Barcelona

Monday 26th November 2018 at 3 p.m. at the IERMB (MRA Building 2nd floor, Autonomous University of Barcelona, Bellaterra)

"Searching a model of energetic assessment to design and organize a more sustainable agricultural production system"

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Conventional agricultural system is extremely dependent on fossil energy, through its consumption in fuel and in external input. Rising prices due to the limit of this non-renewable resource will strongly impact food production. Energy analysis seems to be at the frontier of two world: energy is a strategic component of the economy and at the same time a state thermodynamic variable for ecosystem. Energetic assessment can be used to design and organize a sustainable agricultural production system.

We explore the different methods such as fossil energetic analysis, pluri-energetic assessment, emergy assessment, exergy analysis and the agroecological energetic assessment. We are analyzing those methods through key features such as formalization, system modeling, inventoried flows, indicators and usability. The agroecological energetic assessment is a promising approach with a circular vision, representation of biomass reuse and an associated biodiversity maintaining the functionality of the agro-ecosystem. In front of the development of renewable energy at farm scale, we are searching to integrate the process of high quality energy carrier production.

Studies show that integrating soil organic matter (SOM) in the energetic balance can change the conclusion of the assessment. But, no methods reveal a clear consideration of the energy storage within the system. The energetic organization of the agro-ecosystem also involves the management of the production, consumption and energy storage stages. Storage periods or moments of production or energy consumption are different depending on the nature of the system components (crop production, photovoltaic, wind, soil organic matter,...). Integrating SOM, biomass reuse and energy stored within the system could help energetic assessment to design and organize a more sustainable agricultural production system.