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Circular agriculture application to cropping systems and soil fertility: a case study to assess the potential of Moroccan oasis farms to produce OWPs

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Abstract :

Circular agriculture provides an integrated management of soil organic inputs and crop residues to enhance soil fertility and the sustainability of cropping systems. This study developed a cropping system typology and investigated the effects of crop rotation, organic fertilization and crop residue management on soil fertility properties. It also assessed the potential of oasis farms to generate and use organic waste products (OWP) in a circular agriculture model. Oasis farmers in the Drâa-Tafilalet region of Morocco were interviewed, and the soil on the farms was sampled and analyzed. The quantities of dry palm and manure produced were calculated. In Type I cropping systems, which dominated, date palmwas associated with cereals, fodder and perennial crops. In Type II cropping systems, date palm was cultivated in monoculture with a single cultivar. In Type III, date palm was combined with other crops on part of the utilized agricultural area, and in monoculture on the other part. In all cropping systems, the average soil organic matter (SOM) content was less than 1.5%, and the SOM:clay ratio was less than 12%; soil structure was therefore degraded. Organic soil inputs were low and mainly based on manure. Livestock was combined with crops in Type I and III cropping systems and generated 19.4 and 24.2 t of manure per farm annually, respectively. Cropping systems Type I and II produced 0.98 and 2.1 t.ha-1 of dry palms annually, respectively. Recycling such OWP instead of their burning is considered a potentially valuable alternative to produce organic inputs and compensate for the current lack of manure in a circular agriculture model.

Biography:

Mustapha EL JANATI is a 3rd year Ph.D. student at Agrocampus-Ouest (France) and InstitutAgronomique et Vétérinaire Hassan II (Morocco). His PhD thesis is in dual doctoral program between these two agronomic institutes. He is currently working on the composting of organic material from date palm residues and other sources, and the effect of compost application on soil fertility and silage maize growth and yield in Oasis region of Morocco. He holds an agronomic engineering degree in management of crops production and environment from the Institute of Agronomy and Veterinary Hassan II in Rabat in 2017. His research interests include agronomy, soil fertility, organic waste products, composting, crop fertilization and sustainable cropping systems.

Note: - This work is partly presented at Webinar on Renewable Energy and Resources on April 30, 2021.