**Changes in microbial and edaphic properties in amended soils**

**Introduction**

With a continuously increasing global population, food production demanding, competition for land and water resources and the influence of climate change, our soils are under pressure. With 33% of the world's soil degraded (FAO, 2015), it's about time we start returning the soil something back. Soil amendment addition, like compost, vermicompost, biochar or slurry etc is one of the most effective ways which could improve biological activity and edaphic properties of soil.

Amended soil will be beneficial by reducing risk of erosion, regulating the moisture, getting macro- and micronutrients and improving cation exchange capacity. And growing number of studies had underlined the key role of microbial community are the main driver of soil processes and functions including gaseous emission, decomposition and nutrient cycling. Therefore, there is a need to focus on which key species and functional community changed in the amended soil and how this impact on the soil processes and functions.

**Research activities**

The study, by comparing soils amended with different products (chosen within the study), is aimed at figuring out the change of soil chemical and biochemical properties and the structure and abundance of the microbial community involved in soil carbon and nitrogen cycling. The inter relationships between microbial communities and edaphic properties will also be outlined. There are two major groups of activities as follows:

1. **Effects of edaphic properties on different amended soils**

At each sampling time, soil samples will be taken from different treatments in order to monitor pH, SOM, SON, TOC, SC, MBC, soil respiration rate and moisture etc.

1. **Effects of microbial community involved in carbon and nitrogen transformation in different amended soil.**

By using real-time PCR, target gene abundance which related to carbon and nitrogen cycling will be evaluated. PCR-DGGE and/or NGS will be employed to determine the microbial community structure and shifts. Structural equation modelling will be used to assess the direct and indirect effects of microbial change.