**SECOND WORKSHOP ON WATER PARTITIONING AND PLANT-SOIL INTERACTIONS IN FORESTED AND AGRICULTURAL CATCHMENTS, TUSCANY | ITALY | 26–28 JULY 2022**

**Abstract Submission**

# Tracing water use patterns and carbon interactions in agricultural co-cropping systems using stable water isotopes

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Abstract

Regular water availability for agricultural production is becoming a challenge globally as the impact of climate change increases. While agricultural co-cropping systems have been shown to have many benefits such as higher yields, increased land productivity, improved soil health and biodiversity, its potential for increasing agricultural production resilience to drought is not yet fully understood. The understanding of plant water use strategies that exist in agricultural co-cropping systems and its interlinkages with carbon content especially in temperate climates are largely missing. This study aims to address these knowledge gaps by tracing the sources and depths of water uptake by co-existing crops compared with their respective monocultures, and how these change throughout the growing season including during water-stressed conditions using stable water isotopes. It will focus on identifying crop combinations that could optimise water use and sequester more carbon in temperate regions especially under climate change. Furthermore, the study will involve optimising productivity in co-existing crops using different crop genotypes as well as crop types with trait complementarity. The mechanistic understanding of plant water use efficiency and patterns, soil water distribution and carbon interactions in co-existing crops will help to design appropriate water management and agricultural policies, useful for both climate change mitigation and adaptation measures.