**Session Proposal**

# Session Title

Beyond Plant Available Water – New Insights on Soil Water Accessibility

# Session Organizers

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# Session Description

Soil water availability—traditionally defined as the soil moisture held between field capacity and wilting point—has long been fundamental in soil science and agronomy. However, recent evidence suggests that not all "available" water is equally accessible to plants due to constraints imposed by soil physical properties, biogeochemical conditions, and climatic factors. Clarifying the distinction between soil water availability and accessibility—defined as the fraction of water plants can effectively extract—offers a refined framework to enhance our understanding of plant water uptake, drought stress responses, and land–atmosphere interactions.

Under climate change, plants increasingly encounter scenarios where considerable soil moisture remains present but inaccessible, as seen during rapid-onset "flash droughts" Integrating the concept of water accessibility into hydrological and ecological models can significantly improve predictions of drought impacts and crop productivity, guiding more targeted irrigation practices and climate adaptation measures by identifying water pools critical for plant survival.

This session promotes interdisciplinary collaboration among soil physics, ecohydrology, and meteorology, focusing on how soil structural properties (such as pore size distribution, connectivity, and hydraulic conductivity) and root traits (architecture, depth, root–soil contact, and exudation) influence plant-accessible water. It will explore emerging measurement technologies, next-generation modeling approaches, and global implications for drought forecasting and Earth system modeling.

# Format

Oral presentations, and poster presentations

# Proposed Speakers

Speaker 1

Rainer Horn, University of Kiel, Kiel, Germany, [rhorn@soils.uni-kiel.de](mailto:rhorn@soils.uni-kiel.de)

Professor Rainer Horn is a distinguished German soil scientist renowned for his extensive contributions to soil physics and ecology. He earned his Diploma in Horticulture from the University of Hannover in 1973, followed by a Ph.D. in Soil Science in 1976 under the mentorship of Prof. Dr. Dr. hc. K.H. Hartge. In 1981, he achieved his Habilitation at the Technical University of Berlin. From 1998 to 2017, Prof. Horn held the Chair of Soil Science at Kiel University, Germany. His research primarily focuses on soil structure, soil compaction, and the physical degradation of soils. Prof. Horn has been honored with several awards, including Fellowships from the American Soil Science Society and the American Society of Agronomy. He had also served as President of both the German Soil Science Society and the International Union of Soil Sciences (IUSS).

Speaker 2

Brent Clothier, The New Zealand Institute for Plant and Food Research Limited, New Zealand, [Brent.Clothier@plantandfood.co.nz](mailto:Brent.Clothier@plantandfood.co.nz)

Dr Brent Clothier is a Principal Scientist at Plant & Food Research, an Adjunct Professor at Massey University, Lincoln University and China Agricultural University and Fellow and now President of the Royal Society of New Zealand. Dr Clothier has made a significant contribution to horticultural and agricultural science over the last 46 years of his career. He is a world-leading soil and water scientist and his work has enhanced our understanding of the natural capital that the environment provides to grow our crops so that we can better make informed land use decisions. Dr Clothier’s work on water footprinting, soil science and climate change has prepared New Zealand’s primary production systems for tomorrow’s challenges.