Precision field-based wheat phenotyping platforms have been developed with the support of the CGIAR WHEAT Program and co-investing national agricultural research institutes (Figure 1). The objective is to generate multi-location phenotypic data on prioritized traits, under defined good practices, and fostering germplasm exchange.

Within this network, a new phenotyping platform has been established for the evaluation of drought and heat stress tolerance in wheat, under controlled field conditions and using lysimeter facilities. The platform is placed in a semiarid environment in Central Morocco, at INRA Station in Sidi El Aydi- CRRRA Settat. The lysimeter main structure was completed in July 2019, and it is currently under a final round of fine-tuning. The lysimeter is expected to be fully functional in 2020, with capacities for a precise and continuous record of physiological variables (Figure 2).

Projects to be soon implemented aim to test night transpiration in wheat lines under high night temperatures and different water stress levels. Previous studies in wheat reported high genetic variability for night transpiration under drought, nonlinear responses between day and night transpiration, and differential acclimation strategies between different genotypes.

Based on this, primary goals for the platform will be to (i) determine genetic variability in wheat responses to day-night variation on water transpired, (ii) estimate the effect of environmental parameters on night transpiration (in particular, VPD and temperature), (iii) measure the impact of the night transpiration on yield and yield components, (iv) compare field and lysimeter protocols, and (v) identify if any surrogate, such as canopy temperature, can be used to predict night transpiration to identify lines with enhanced drought and heat tolerance. It is expected that the generated information will contribute to rapid advances in breeding for semiarid regions, building on efficiency and capacity for research.

For further details and opportunities for research collaborations, please contact Andrea Visioni (A.Visioni@cgiar.org) and Carolina Saint Pierre (c.saintpierre@cgiar.org)