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A Living Lab approach for a multi-scale experimentation in Northern Italy on drought resistant maize hybrids

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Maize is high-water requirements crop and plays an important role in Northern Italy, however, periods of drought in recent years have compromised crop yield. In this context, drought-tolerant (DT) maize hybrids could help addressing water scarcity, without compromising grain health, with a result that can be influenced by both the agronomic management and pedoclimatic conditions. For this reason, in 2023 at the Universities of Padua (UNIPD) and Turin (UNITO) started an experimentation to compare DT maize hybrids to conventional ones. The activities were carried out both in plot experimentations (PEs) and in On Farm Experimentations (OFEs) mobilizing a Living Lab approach. In a PE at its experimental farm, UNIPD compared six hybrids (DT and conventional hybrids, FAO classes 300, 400 and 500) both in irrigated and in rainfed conditions. There was a significant effect of irrigation, that resulted in a yield of 13.4 t DM ha⁻¹ and 9.0 t DM ha⁻¹ in irrigated and rainfed plots, respectively. Conventional hybrids yielded slightly more than DT ones (on average 11.5 vs. 10.9 t DM ha⁻¹). In an OFE, UNIPD compared two DT hybrids with a conventional one in rainfed conditions. Conventional hybrid produced more than the DT ones (10.4 vs. 9.4 t DM ha⁻¹). Conversely, in another OFE, UNIPD recorded a slightly higher productivity of the DT hybrid compared to the conventional one (6.4 vs. 5.8 t DM ha⁻¹). In one PE and 4 OFE, UNITO evaluated four hybrids (DT and conventional hybrids, FAO classes 300 and 500). In the UNITO PE, the FAO 300 DT was more productive than the conventional one (on average 10.3 vs. 9.4 t DM ha⁻¹), both in irrigated and rainfed conditions. Similarly, FAO 500 DT was more productive than the conventional one (on average 13.6 vs. 11.9 t DM ha⁻¹). In 2024, UNIPD and UNITO are involved in a second year of PEs and OFEs, whereas the University of Udine (UNIUD) joined the activities of both PEs - at the experimental farms - and OFEs. In the UNIUD OFEs, two farms will compare two FAO 500 hybrids, the one DT and the other conventional. Furthermore, in one farm, a DT FAO 400 hybrid will also be tested. In one farm, cultivation will be rainfed and the hybrids' performances will be compared in soils with different depth and gravel content, whereas in the other farm, the genotypes will be tested in both irrigated and rainfed conditions. These PEs and OFEs in a multi-temporal experiment will support our understanding of the best conditions for DT maize hybrids in Northern Italy. Acknowledgments. This study was carried out within the Agritech National Research Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) -

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