Session Biosphere: April 13th 09.00 hrs

1s5 Nature-based solutions for circular food systems under climate change

Evaluating the performance of a Subsurface Water Retention System (SWRS) prototype: first assessment of work productiv-ity and costs

Luigi Pari, Francesco Latterini, Nadia Palmieri, Walter Stefanoni

1) Consiglio per la Ricerca in Agricoltura e l'analisi dell'Economia Agraria (CREA)—Centro di Ricerca Ingegneria e Trasformazioni Agroalimentari, Via della Pascolare 16, Monterotondo, 00015 Rome

---

Global warming and climate change are threatening the effectiveness of agriculture in Mediterranean area, which is worldwide considered as a hotspot of climate change. In particular, increasing aridity and occurrence of extreme rainfall events can have detrimental effects on agriculture, therefore there is the strong need of increasing its resilience. One of the possible solutions to tackle this issue consists of applying rain water harvesting technology (RWH), and in particular Subsurface Water Retention System (SWRS). This last consists of applying an impermeable membrane in the root zone, preventing water loss via deep percolation in sandy soils. SWRS has been studied in the recent years, highlighting its effectiveness in increasing several crops yield in arid and semi-arid climate. However, its application is limited only to laboratorial scale, due to the lack of an efficient machinery to set up the SWRS extensively. One of the aims of MediOpuntia project was properly the development of a SWRS prototype. This work represents a preliminary study, in which the evaluation of work productivity and costs of SWRS installation via this prototype was performed. The obtained results are encouraging, indeed the prototype reached target depth of 1 m for the installation of the film. Effective Field Capacity (EFC) of 0.19 ha h-1 was reached, but it can be further improved working in conditions of lower presence of crop residues, which in the studied case caused clogging of the machine being in a very high amount. SWRS installation costs resulted in more than 4800.00 € ha-1. It is however worth to highlight that SWRS is permanent installation and therefore the costs would incur only once. Further studies are needed to evaluate the effectiveness of SWRS to increase crop yield in extensive field trials.

Keywords: climate change, desertification, rain water harvesting, work performance