**Productive response of a pear orchard (*Pyrus communis, L.*) to the precision irrigation conducted through a Decision Support System (DSS)**

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***Abstract.*** In this study, a soil moisture-based wireless sensor network (SM-WSN) was adopted in a commercial pear orchard to support the reduction of irrigation water consumption. The sensor network was designed and validated during three growing seasons (2019-2021). First, the micro-irrigation system performance was assessed in terms of water distribution uniformity (DU), which was evaluated with field measurements of emitter flow rates. Then, a zoning analysis was carried out to divide the orchard into homogeneous areas according to the normalized difference vegetation index (NDVI) detected with unmanned aerial vehicle (UAV) and GIS tools. In this way, the effect of DU on the vigour of the trees has been identified assuming that the zoning outcome was only associated with the soil spatial variability. Moreover, unlike the ordinary irrigation scheduling applied in the farm, the smart system allowed maintaining the soil water content within a pre-defined optimal range, in which the upper and lower limits corresponded respectively to the soil field capacity and the threshold below which water stress occurs. Based on the smart irrigation management, water-saving up to 50% of the total water supplied with the ordinary schedule was achieved during both investigated growing seasons. In addition, the quality parameters of the production (i.e °Brix, fruit size and firmness) were in line with the standard required by the farmer. The adoption of the new technology, which aims at identifying the most appropriate irrigation management, has therefore the potential to generate positive economic returns and reduce the environmental impacts.