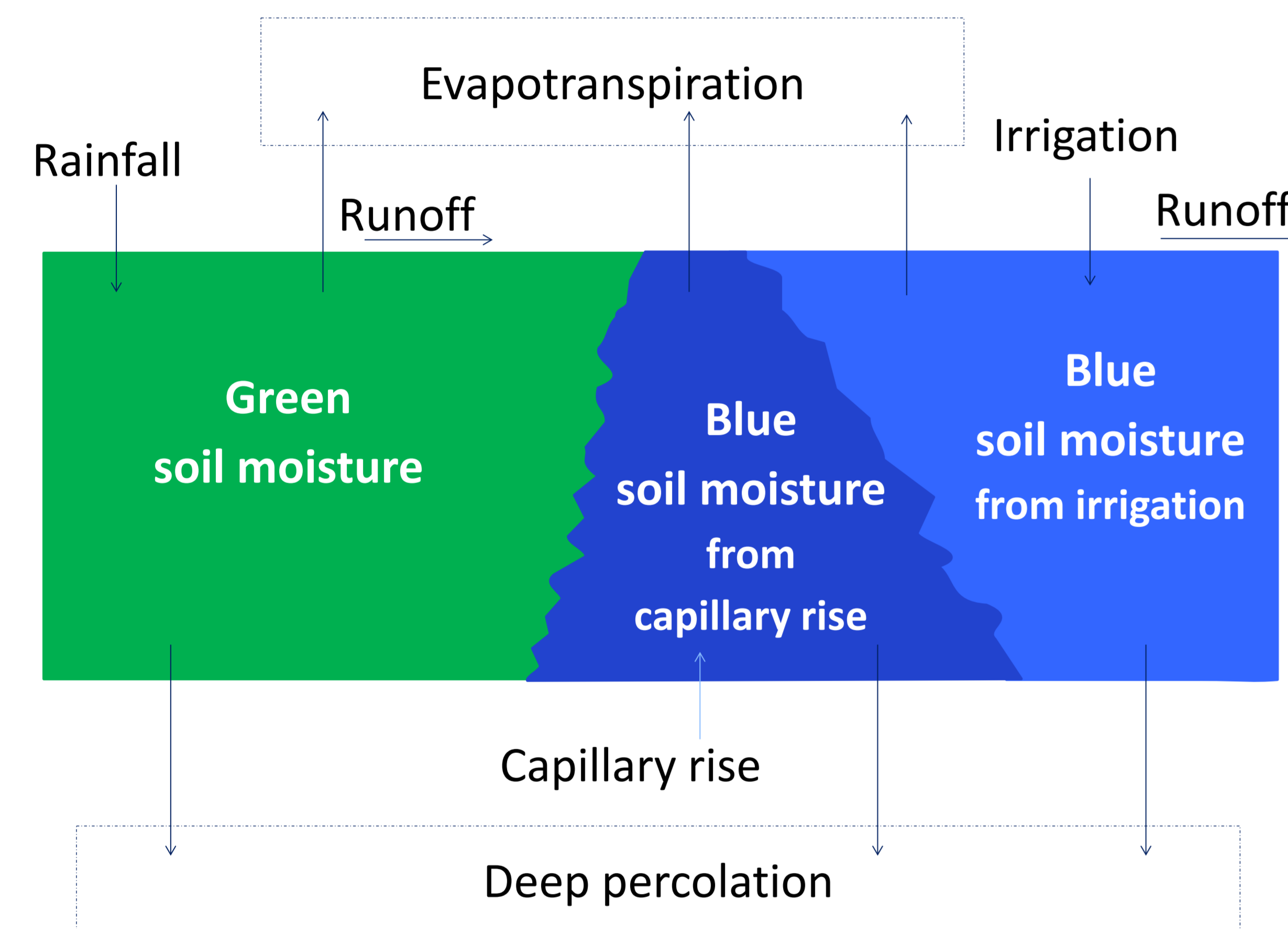


Water footprint reduction in irrigated crop production in arid and semi-arid environments: Effects of irrigation techniques, irrigation strategies and mulching practices

Chukalla, A.D.; Krol, M. S.; Hoekstra, A. Y.
Twente Water Center, University of Twente
Contact: a.d.chukalla@utwente.nl

Introduction

Water footprint (WF) reduction in irrigated crop production is essential given the increasing competition over fresh water. Our study explores measures that affect the soil-water-balance and plant-growth, and thus influence yield (Y) and/or evapotranspiration (ET) and therefore the WF of a crop.



Partitioning of soil water into:
(1) green soil moisture and
(2) blue soil moisture

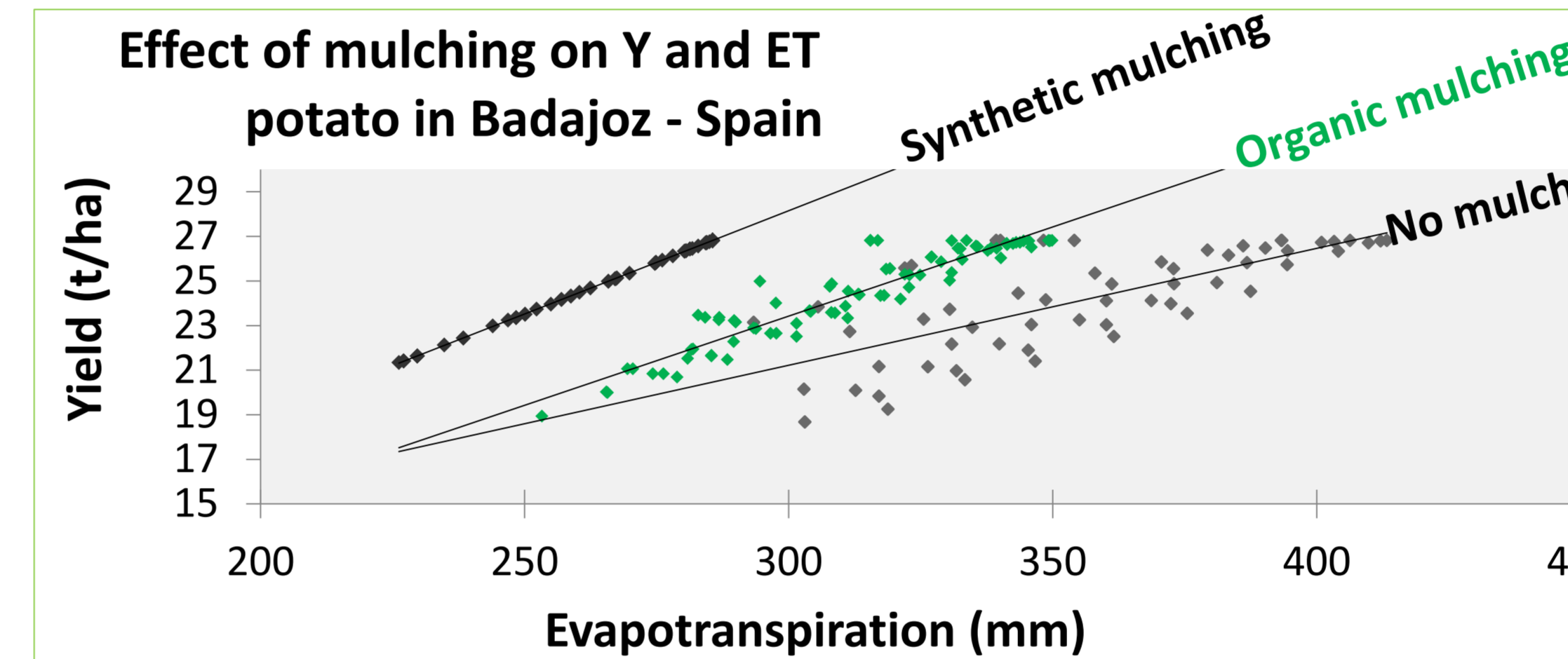
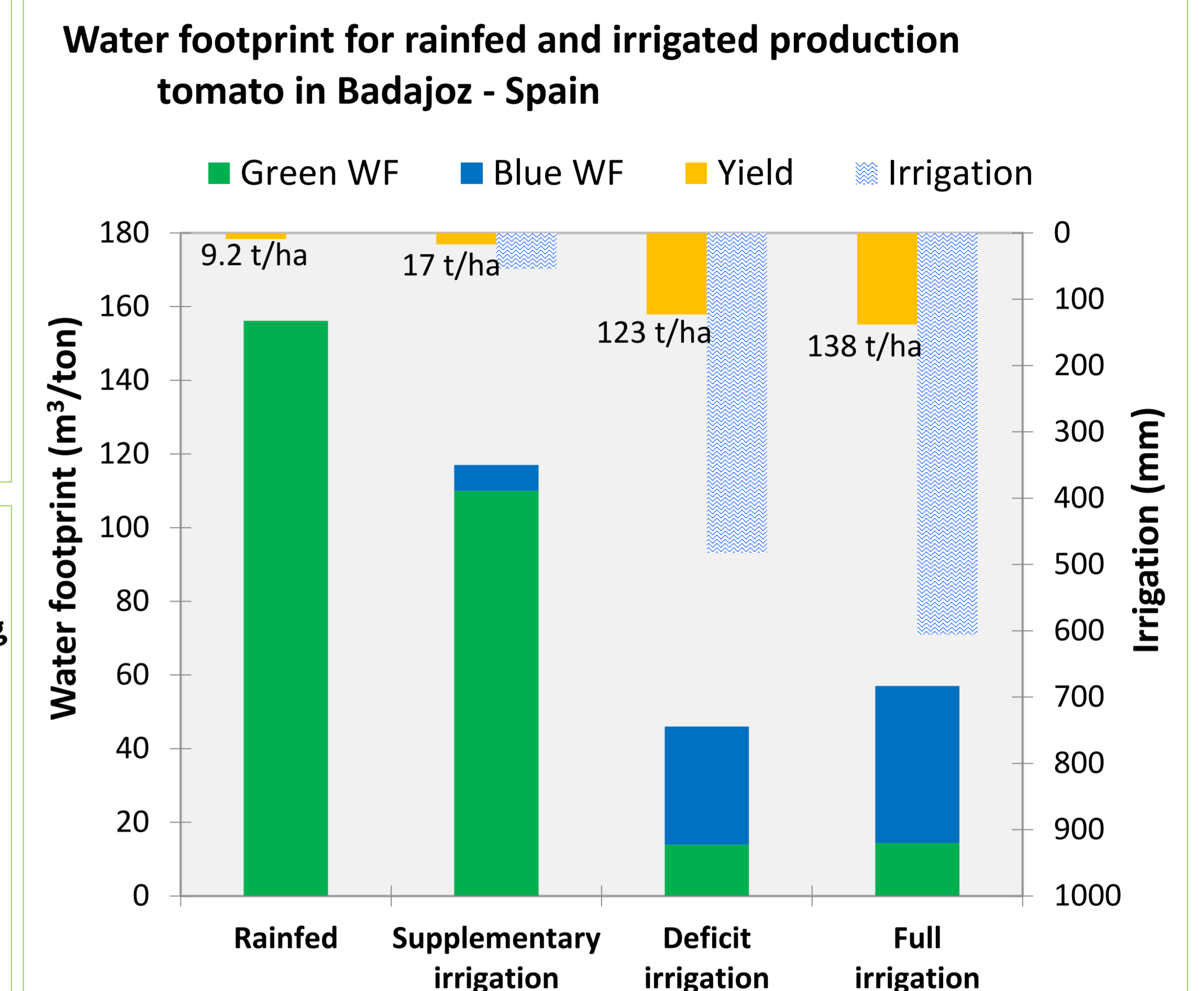
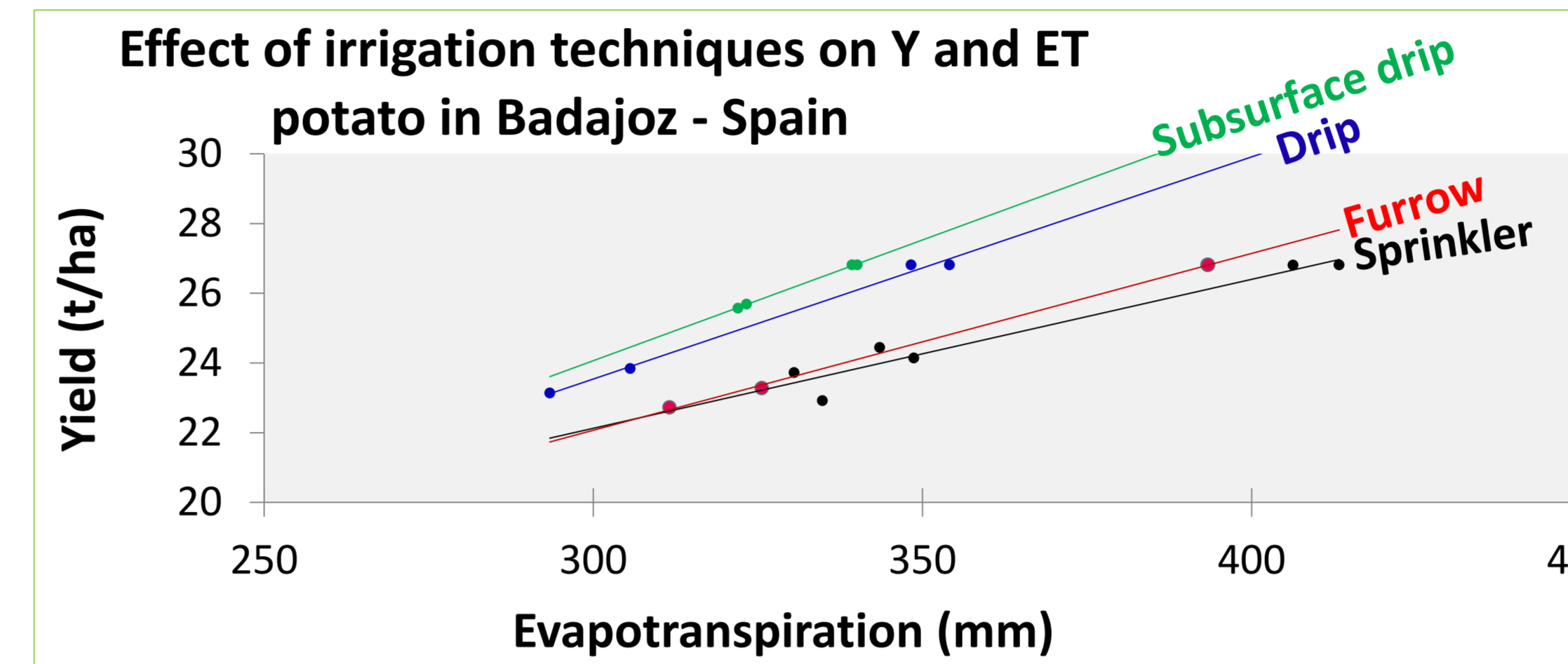
Method

Measures	Modelling	Effects
Management options 1. Four irrigation techniques: Furrow, Sprinkler, Drip and Subsurface drip (SSD); 2. Three irrigation strategies: full irrigation, deficit irrigation & supplementary irrigation; + rainfed; 3. Three mulching practices: no mulching, organic & synthetic mulching.	AquaCrop WF accounting	Green and Blue WF of growing crops

Cases

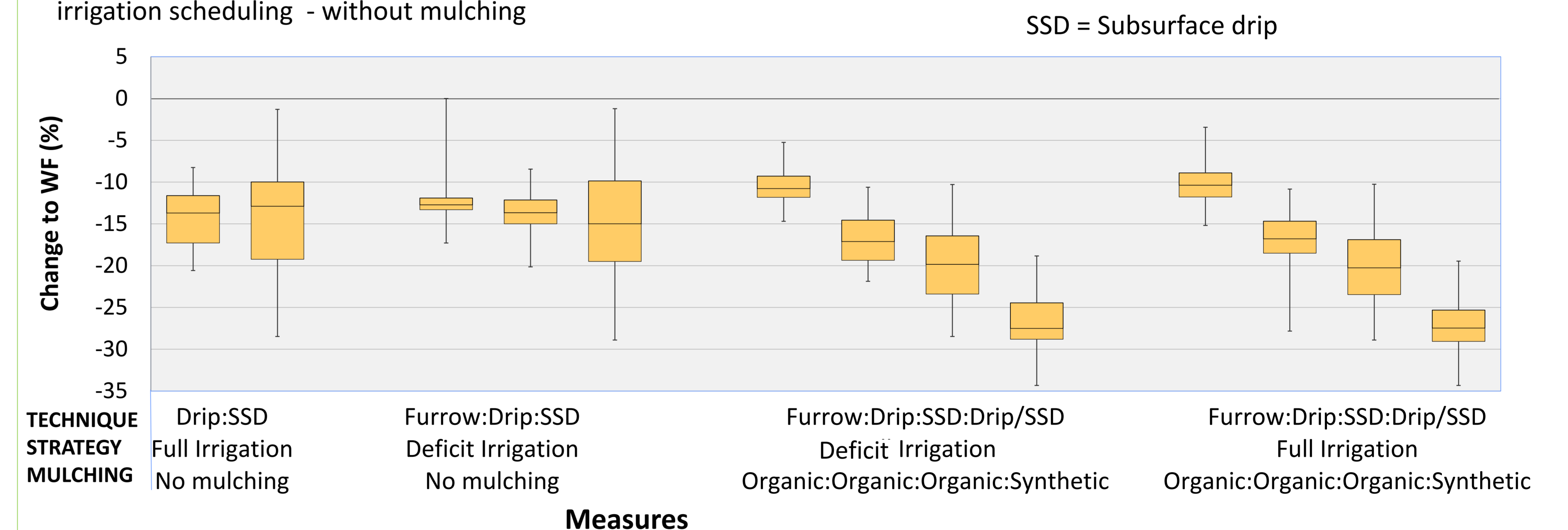
Two environments (arid in Israel & semi-arid in Spain), three crops (maize, potato & tomato), three soils (loam, sandy loam & silty clay loam), three types of years (wet, normal & dry)

Results



Reduction in water footprint

The change in Water footprint (ΔWF) was compared to a reference of Furrow technique with non-water stress irrigation scheduling - without mulching



Conclusion

The reduction in water footprint compared to the reference (the furrow technique with non-water stress irrigation scheduling and without mulching) is: (1) 3 to 12% for Drip or Subsurface drip, (2) 10% for organic mulching, (3) 20% for Drip and subsurface drip with organic mulching, and (4) 28% for Drip and subsurface drip with synthetic mulching.

Acknowledgment

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