The agronomic benefit of annual or perennial forage legume varieties in double cropping system models more with irrigation than under rain-fed growing conditions reduces the agronomic impact of the weather on OC, favours the turnover of biochemical characteristics and extends the edaphic habitat of the fodder crops in the rain-fed UAA of Mediterranean environments.

Conclusions

Crop system models of autumn legume varieties in comparison to those of grasses increased OC by 2.44 with irrigation and 0.99 g kg^{-1} under rain-fed conditions. The irrigated and rain-fed treatments of the crop system models based on autumn legume varieties were less productive in terms of MFU ha^{-1} than in grasses. The use of annual and perennial legume varieties in the crop systems, particularly under irrigated treatment, represents a management practice that can reduce the reduction of OC in the topsoil of environments with a Mediterranean climate.

The benefits achieved by crop system models based on annual and perennial legume varieties under natural or irrigated growing conditions show that this agronomic approach can recover the OC turnover in the topsoil and sustain forage production in EU environments.

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