III International Scientific Conference "**Sustainable and efficient use of energy, water and natural resources – SEWAN-2021**"

Title: Soil Moisture Index on the basis of reference evapotranspiration Penman Monteith method using remote sensing methods

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Keywords:

Google Earth Engine,Soil Moisture Index, Evapotranspitation.

Introduction

Drought is a complex natural phenomenon, which can affect food production and food safety. Especially for those families whose main livelihood is agriculture.

On the last decade, drought episodes have become widespread and prolonged in different areas around the world. Currently, there is increasing frequency and intensity drought because of global warming *(Hernández, T. 2018)* .

Source: Listín Diario

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Research Objective

Determine the soil moisture index (SMI) on the basis of reference evapotranspiration, Penman Monteith method, and the condition of agricultural drought.

Source: FAO

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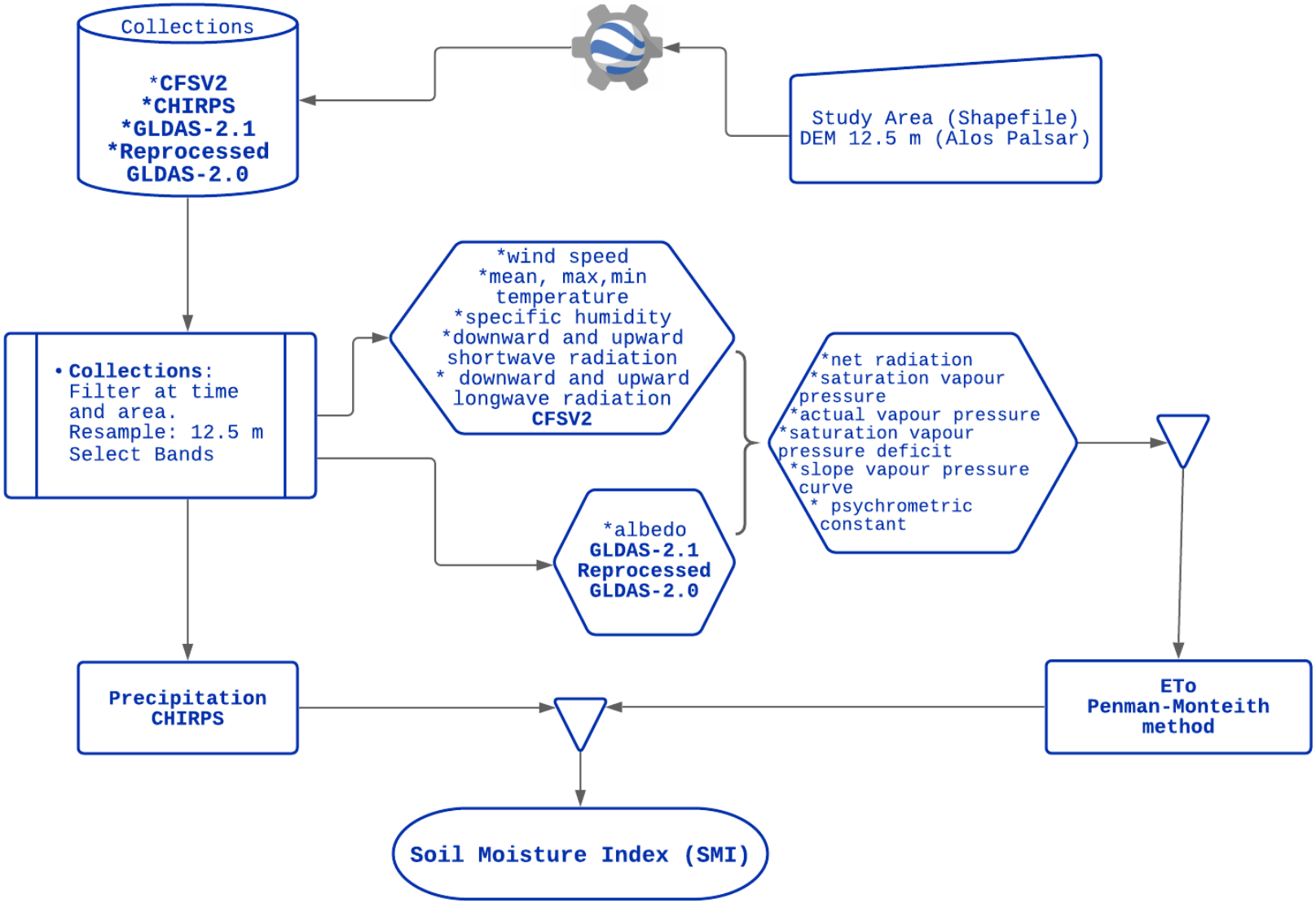
Methodology



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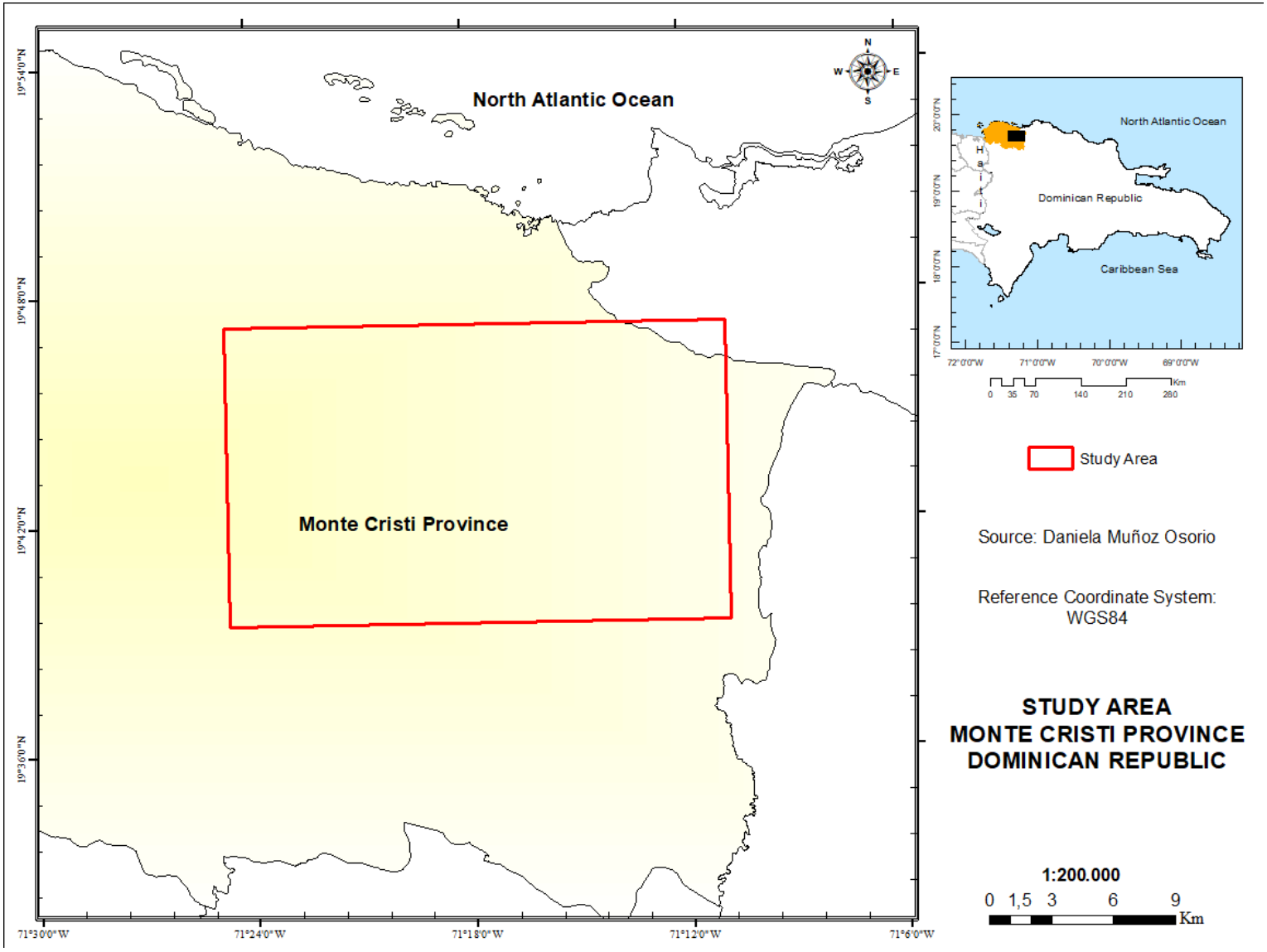
Study Area



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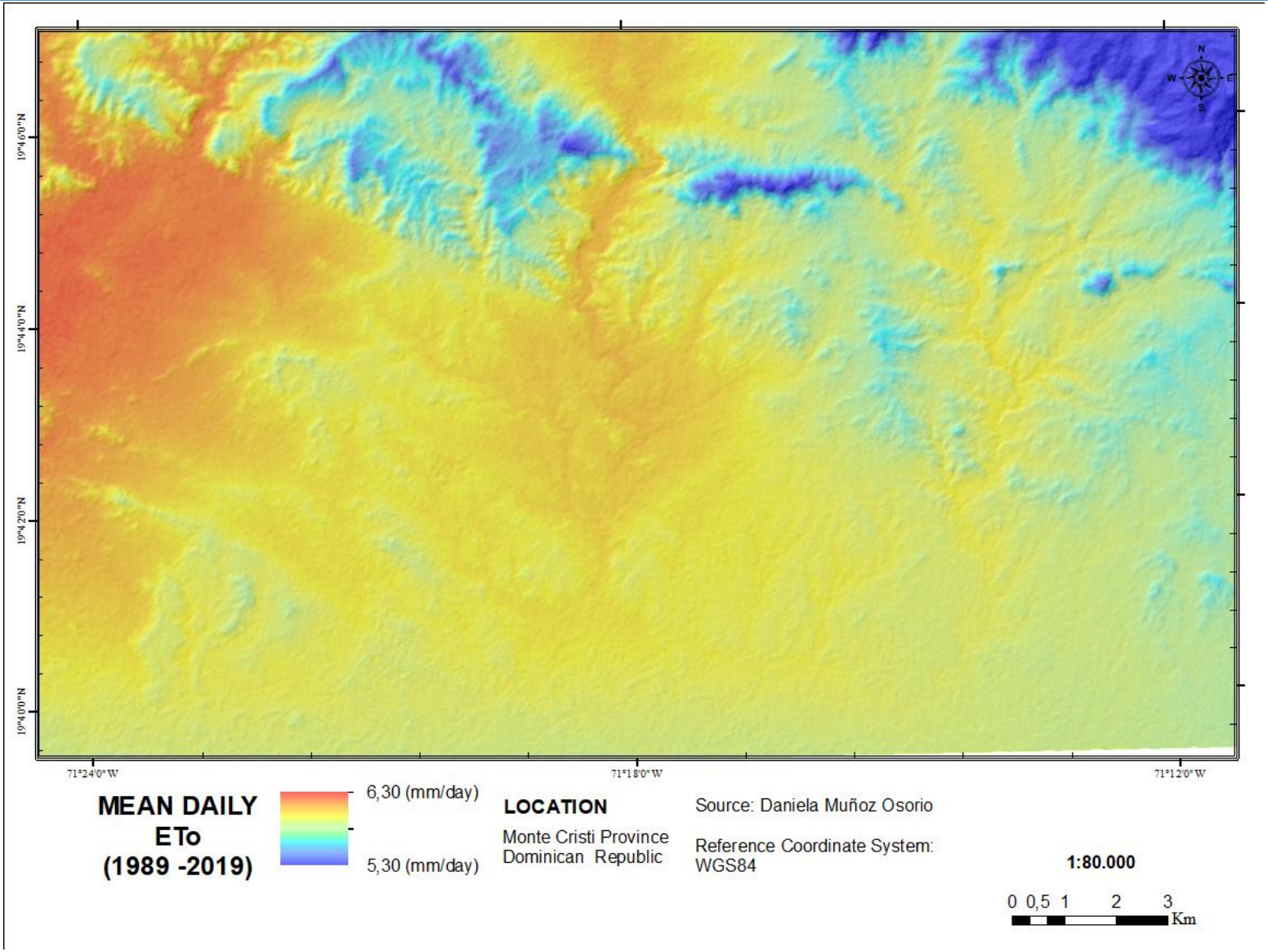
Results



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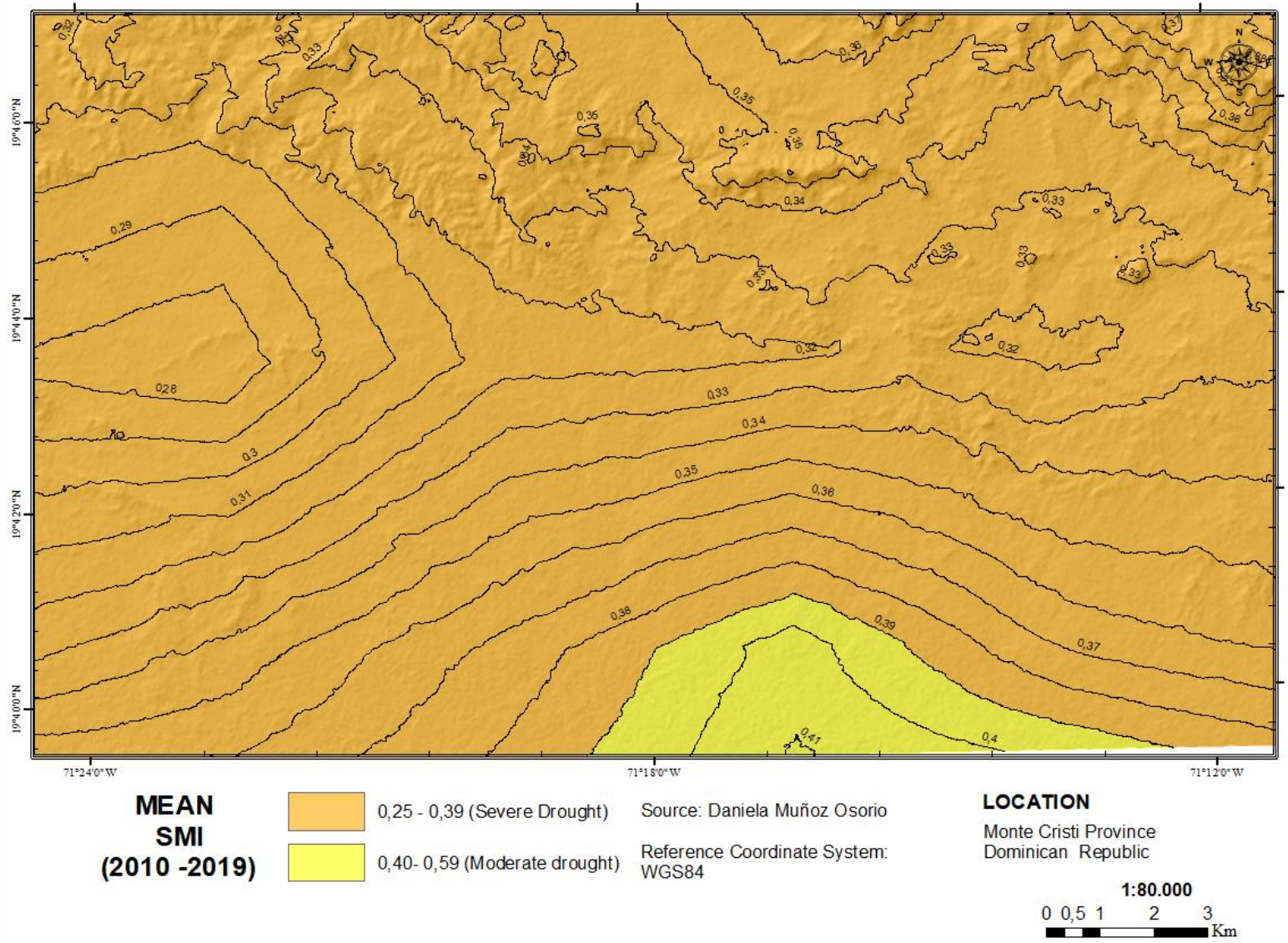
Results

- < 0,24 (Extreme Drought)
- 0,25-0,39 (Severe Drought)
- 0,40-0,59 (Moderate Drought)
- 0,60-0,79 (Mild Drought)
- 0,8-1,2 (Normal)
- 1,2-2,1 (High Moisture)
- >2,1 (Extreme Moisture)

Soil Moisture Index thresholds by Vigil Black et al., 2019.



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Conclusions

- An application of the dataset in the Montecristi province proved that the soil moisture index is an appropriate indicator to characterize drought. Its average value from 2010 to 2019 was between 0.27 and 0.41, which given the thresholds by (Vigil Black et al., 2019) correspond to moderate drought, in the southern zone, and severe drought in the rest of the area. Also, characteristic hydro-climatological values were estimated, and extreme evapotranspiration zones were identified.

- The data set and the humidity index calculation method allow efficient planning of fieldwork, irrigation management, and even calculating the water layer to apply as the crop adapts to the conditions of irrigation frequency. Moreover, the time series of meteorological data has the potential to be used in water demand studies, irrigation plans and modelling of crop yields.

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References

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Thank you for your attention!

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