

Irrigation Management at field scale in the Algerri-Balaguer District

H2020-PRIMA-S2-2019, 2020-2023, GA# ANR-19-P026-0003

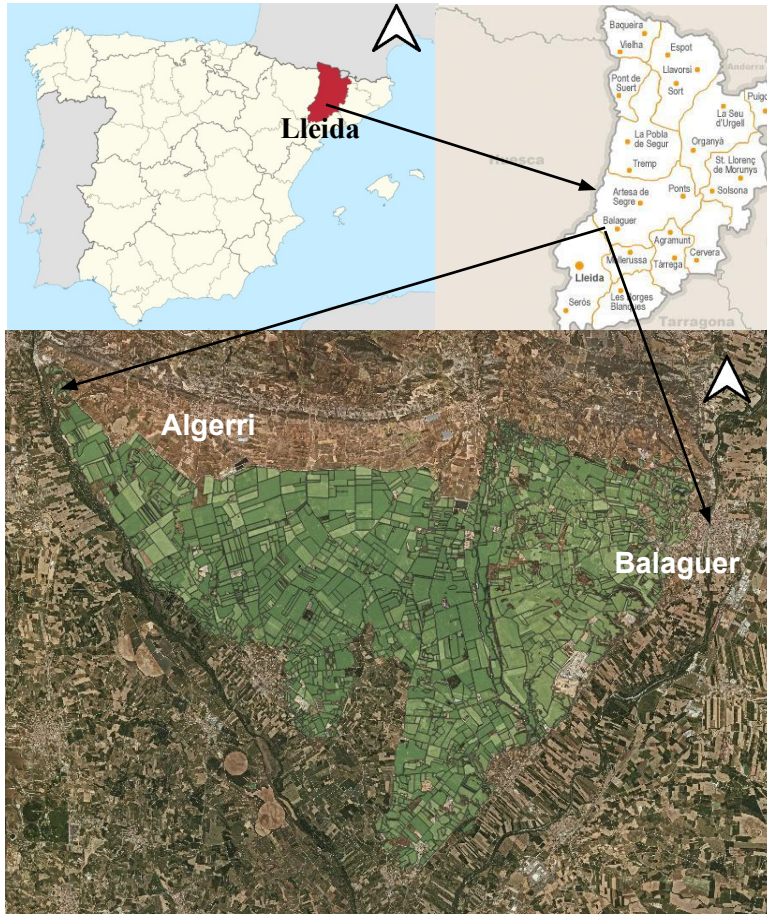
Víctor Altés

Soil Science and Environment Department, University of Lleida

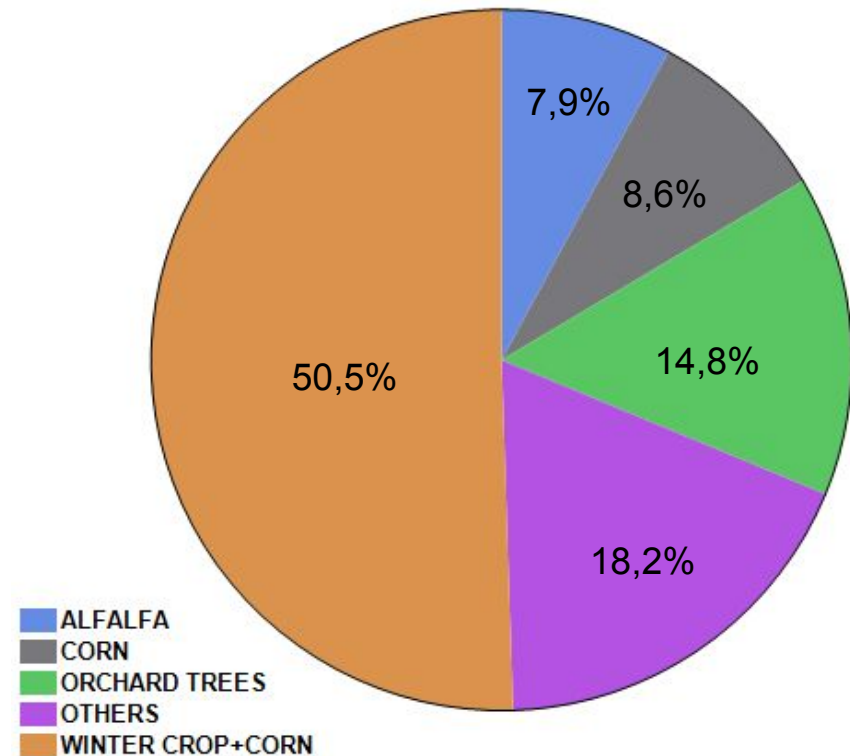
Open Project Day

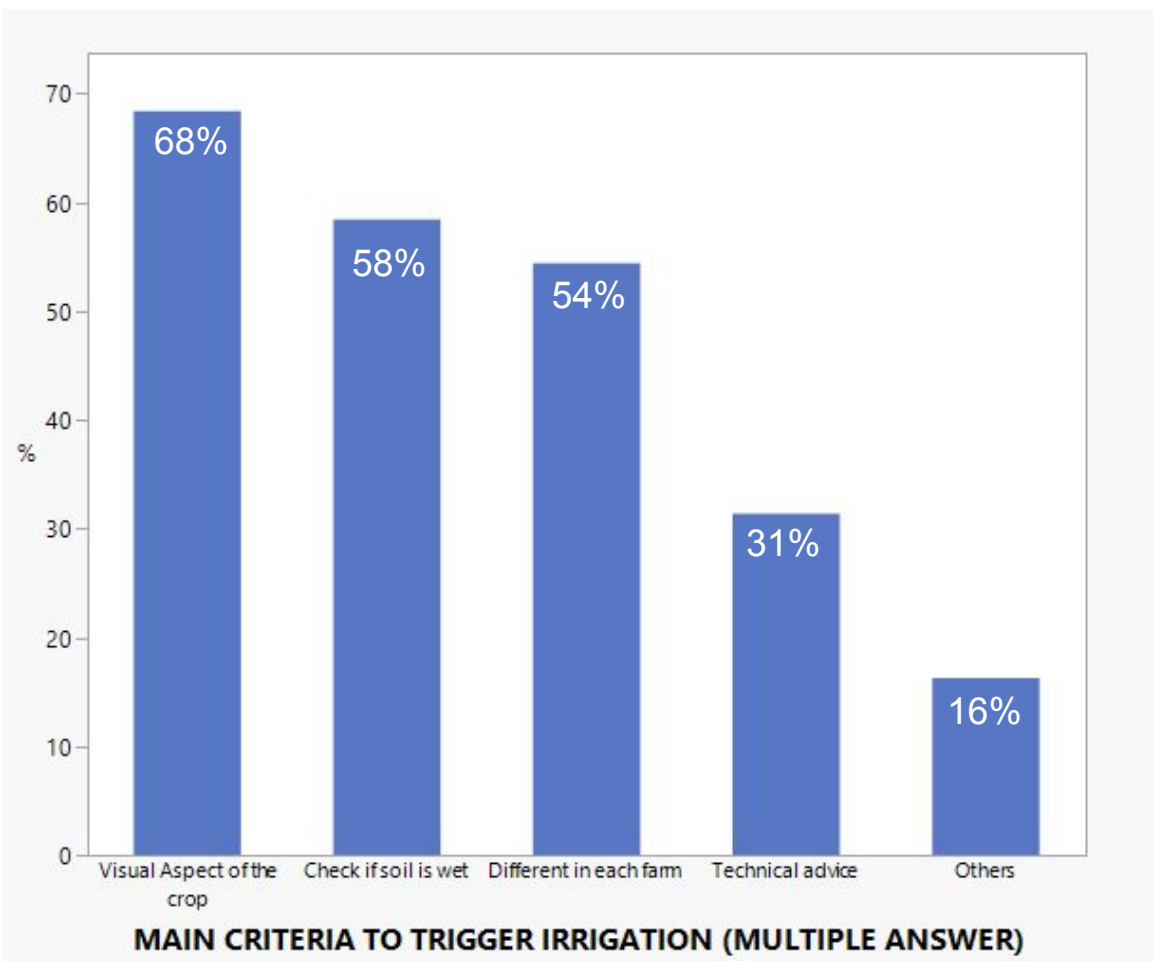
isardSAT, Barcelona | March 11th, 2022





- Algerri Balaguer Irrigation District
- 6620 ha irrigated in 2021.
- Average water use of 6400 m³/ha





- 2050 ha surveyed to understand how farmers irrigate.
- Mainly they rely on the visual aspect of the crop or the humidity of the soil to irrigate.
- Mean doses of 7 mm/day (during high necessities period).
- Not big confidence in technical advice (public: Oficina del Regant or private).

$$ET_c = K_c \cdot ET_o$$

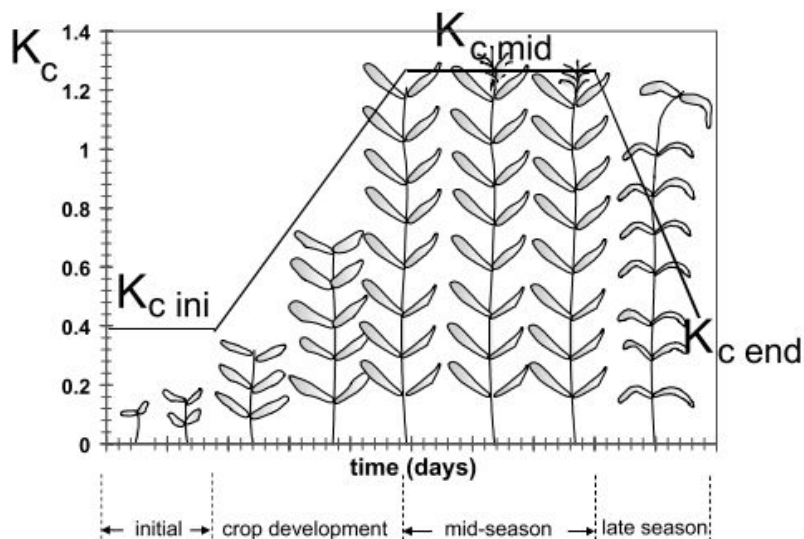
$$GIWN = \frac{ET_c}{EA^*}$$

According to Allen et al. (1998) K_c in corn in subhumid climates:

$$K_{c\ ini} = 0,3$$

$$K_{c\ mid} = 1,2$$

$$K_{c\ end} = 0,35$$



Allen et al. (FAO 56, 1998)

By knowing the LAI and NDVI(if not saturated) approximations to K_c can be made:

- Some studies made in Spain A. Cuesta et al. (ITEA, 2005)

$$K_c = 1,233 \cdot NDVI + 0,197$$

Thanks to TSEB method (J.Bellvert, IRTA) Potential Evapotranspiration (ET_p) and Actual Evapotranspiration (ET_R) can be known at field scale. This allows us to know the total water used by the crop during certain period.

*Values of 0,85 EA (efficiency application) were considered



20 ha field

1st crop Spring Barley

Sowing 10th January

Harvest 16th June

2nd Crop Corn –FAO 400 Cycle

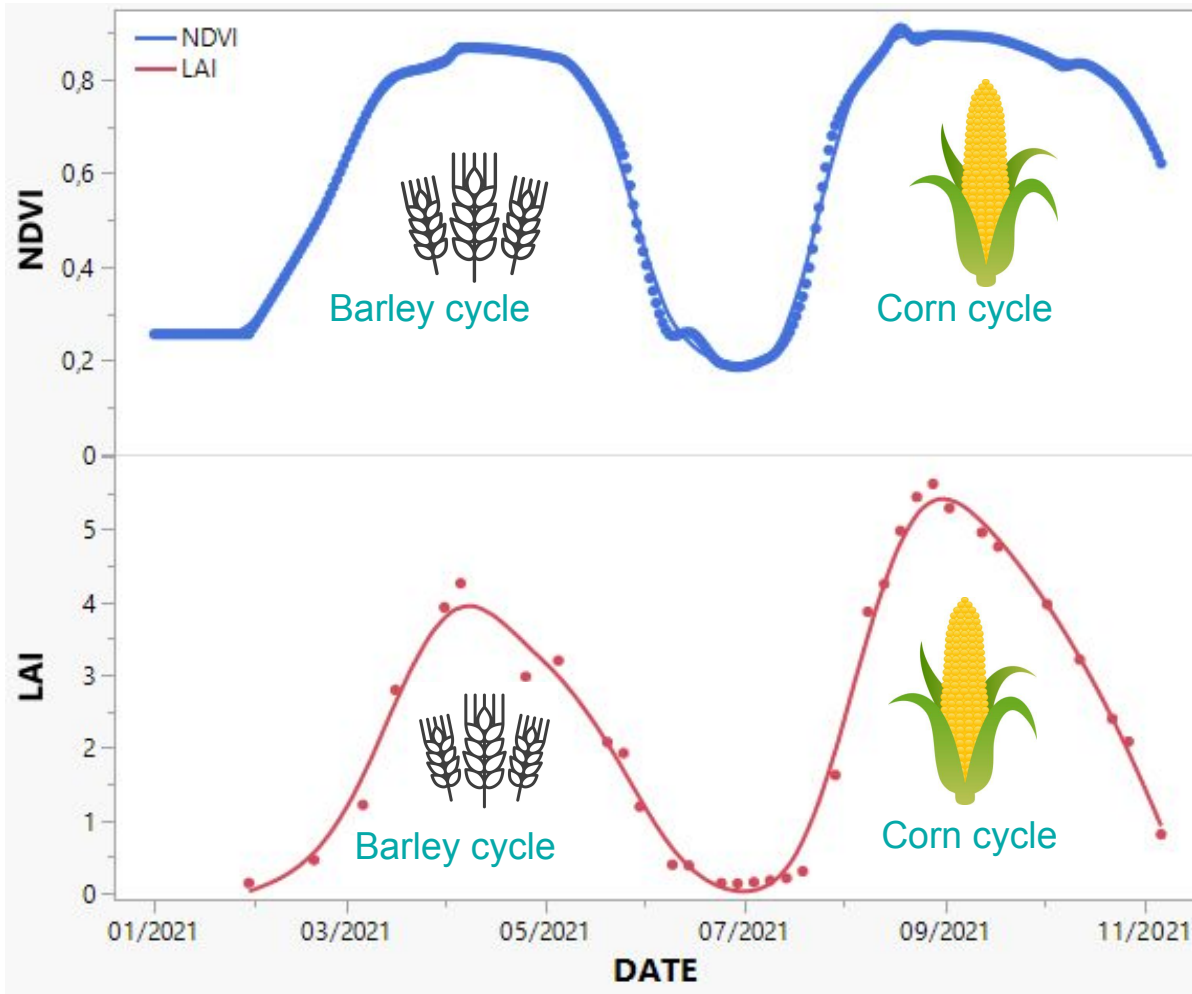
Sowing 25th June 2021

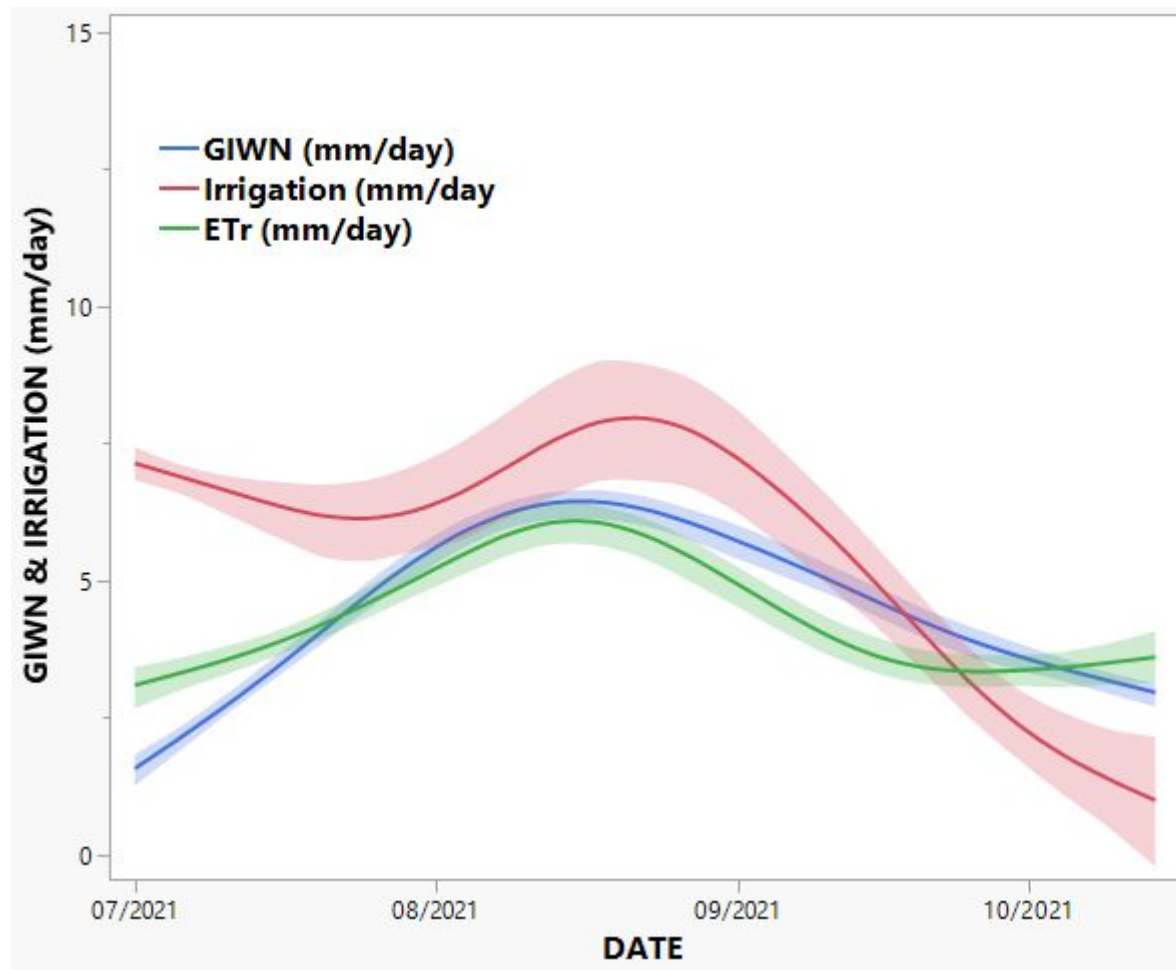
Physiologic Maturity 14th October – 113 days

Harvest 28th December

Yield 12.000 kg /ha (14% RH)

- Total water used during the corn period was monitored hourly in the hydrant.
- NDVI (daily) and LAI (once per week) average values were taken.
- Main criteria to irrigate: visual aspect of the crop and check the humidity of the soil.



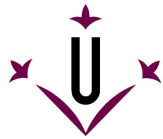


- **6003 m³/ha** used for irrigation until 14th of October.
- Average dose of **5,6 mm/day**.
- Total GIWN **5227 m³/ha**.
- Total ETr, **5195 m³/ha**, average of 4,31 mm/day.

- An excess water of 776 m³/ha or **12,9%** (considering the GIWN) or 808 m³/ha (Considering ET_p) was used during the 2021 corn champing.
- Improvement can be done, mostly in the early stages were the ET_c is not high (2-3 mm/day), but the irrigation was around **7 mm/day**.
- Reducing a 20% the irrigation dose during the first 30 days would lower the total excess water use to a **7%**.



Thank you!



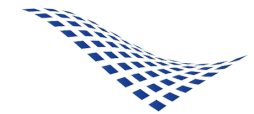
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