



Figure S1. Continuous evolution of volumetric soil water content in the soil profile from 10 to 60 cm depth, for the two irrigation treatments, at an interval of 13 and 9 days during summer, for the years 2020 and 2021, respectively.

Table S1. Evolution of gas exchange parameters in the trial period for melon plants subjected to different irrigation regimes (FRM: farmer criteria and PI: precision irrigation): Net photosynthesis (Pn), leaf conductance (Lc) and midday stem water potential (Ψ_s).

	Year DAT	2020					2021
		36	43	55	60	70	71
Pn ($\mu\text{mol m}^{-2} \text{s}^{-1}$)	FRM	25.55 \pm 1.25 a	16.19 \pm 2.03 a	21.15 \pm 3.80 a	22.70 \pm 2.10 a	19.96 \pm 3.14 a	28.48 \pm 0.43 a
	PI	23.81 \pm 1.58 a	16.82 \pm 3.51 a	21.05 \pm 2.59 a	22.36 \pm 1.17 a	24.55 \pm 0.68 a	27.10 \pm 2.39 a
Lc ($\text{mmol m}^{-2} \text{s}^{-1}$)	FRM	290 \pm 13 a	107 \pm 17 a	276 \pm 46 a	160 \pm 7 a	164 \pm 32 a	380 \pm 14 a
	PI	249 \pm 14 a	106 \pm 18 a	194 \pm 46 a	148 \pm 6 a	168 \pm 13 a	434 \pm 75 a
Ψ_s (MPa)	FRM	−0.53 \pm 0.04 a	−0.60 \pm 0.02 a	−0.55 \pm 0.03 a	−0.37 \pm 0.03 a	−0.48 \pm 0.03 a	−0.44 \pm 0.03 a
	PI	−0.58 \pm 0.02 a	−0.62 \pm 0.01 a	−0.52 \pm 0.04 a	−0.44 \pm 0.03 a	−0.48 \pm 0.03 a	−0.45 \pm 0.02 a

DAT: Days after transplanting. 0 DAT correspond to 30th April in 2020 or 07th April in 2021. Means \pm standard error, $n = 4$.

Different letters for the same parameter and day after transplant (DAT) indicate significant differences according to Duncan's test (p < 0.05).

Table S2. Multispectral indexes and crop ground cover for melon plant subjected to different irrigation regimes (FRM: farmer criteria and PI: precision irrigation).

Year	TRT	NVDI	Ground cover (%)
2020	FRM	0.823 ±0.003 a	95.03 ±0.75 a
	PI	0.816 ±0.006 a	92.91 ±0.46 a
2021	FRM	0.755 ±0.003 a	93.70 ±0.65 a
	PI	0.750 ±0.001 a	94.25 ±1.33 a
TRT (T)		<i>ns</i>	<i>ns</i>
Year (Y)		***	<i>ns</i>
T*Y		<i>ns</i>	<i>ns</i>

Means ± standard error, $n = 4$. Different letters for the same parameter and year indicate significant differences between irrigation treatments according to Duncan's test ($p < 0.05$). ***: $p < 0.001$, **: $p < 0.01$, *: $p < 0.05$ and *ns*: non-significant, for the ANOVA.

Table S3. Evolution of foliar NPK in melon plants subjected to different irrigation regimes (FRM: farmer criteria and PI: precision irrigation) in 2020.

DAT	TRT	N		P		K	
		(%)		(%)		(%)	
46	FRM	4.15 ±0.22	a	0.35 ±0.03	a	3.16 ±0.17	a
	PI	4.11 ±0.25	a	0.32 ±0.02	a	3.48 ±0.09	a
60	FRM	3.80 ±0.08	a	0.23 ±0.01	a	2.02 ±0.20	a
	PI	3.48 ±0.08	b	0.20 ±0.01	b	2.53 ±0.15	a
90	FRM	3.26 ±0.15	a	0.51 ±0.05	b	1.64 ±0.10	a
	PI	2.93 ±0.09	a	0.30 ±0.04	a	1.89 ±0.09	a

DAT: Days after transplanting. 0 DAT correspond to 30th April in 2020 or 07th April in 2021. Means ± standard error, $n = 4$. Different letters for the same parameter and DAT indicate significant differences according to Duncan's test₇ ($p < 0.05$).

Table S4. Harvested melon macro- and micro-nutrients, ammoniacal nitrogen, and nitrate in plants subjected to different irrigation regimes (FRM: farmer criteria and PI: precision irrigation) in 2020.

DAT	TRT	N %		P %		K %		Ca %		Mg %	
90	FRM	0.78 ±0.05	a	0.10 ±0.02	a	2.17 ±0.09	a	0.14 ±0.01	a	0.14 ±0.01	a
	PI	0.86 ±0.07	a	0.10 ±0.02	a	2.16 ±0.12	a	0.14 ±0.03	a	0.13 ±0.01	a

DAT	TRT	Fe mg Kg ⁻¹		Mn mg Kg ⁻¹		Cu mg Kg ⁻¹		Zn mg Kg ⁻¹		B mg Kg ⁻¹		N-NH ₄ ⁺ mg Kg ⁻¹		NO ₃ ⁻ mg Kg ⁻¹	
90	FRM	28.5 ±1.4	a	5.00 ±0.41	a	3.30 ±0.39	a	12.4 ±2.0	a	12.1 ±0.6	a	40.23-4.01	a	426.7 ±96.1	a
	PI	26.5 ±4.6	a	4.48 ±0.31	a	2.53 ±0.30	a	9.6 ±1.0	a	12.7 ±0.5	a	37.40-3.50	a	412.0 ±55.2	a

Different letters for the same parameter and day after transplant (DAT) indicate significant differences according to Duncan's test (p < 0.05).

Table S5. Bulk soil analysis for melon plant subjected to different irrigation regimes (FRM: farmer criteria and PI: precision irrigation) in 2020.

DAT	Depth	TRT	NT %	P ₂ O ₅ mg Kg ⁻¹	K ₂ O mg Kg ⁻¹	CaO mg Kg ⁻¹	MgO mg Kg ⁻¹
0	30	None	0.11	114	594	1540	308
90	30	FRM	0.06 ±0.01	a 82 ±28	a 406 ±161	a 2574 ± 47	a 571 ±42
		PI	0.05 ±0.01	a 60 ± 6	a 255 ± 17	a 2559 ±129	a 504 ±40
90	60	FRM	0.04 ±0.01	a 22 ± 0	a 161 ± 25	a 2641 ± 27	a 539 ±24
		PI	0.02 ±0.01	a 25 ± 1	a 171 ± 10	a 2974 ±361	a 498 ±50

DAT	TRT	pH	CE (1:5) mS/cm	MO %	C/N	Bulk density g cm ⁻³	CEC meq 100g ⁻¹
0	30	None	8.03	0.31	1.42	7.58	1.40
90	30	FRM	7.56 ±0.07	a 0.47 ±0.16	a 0.67 ±0.16	a 6.62 ±0.77	a 1.48 ±0.01
		PI	7.65 ±0.05	a 0.34 ±0.03	a 0.59 ±0.08	a 6.83 ±0.26	a 1.50 ±0.02
90	60	FRM	7.58 ±0.01	a 0.17 ±0.01	a 0.24 ±0.02	a 4.12 ±0.23	a 1.49 ±0.01
		PI	7.63 ±0.04	a 0.20 ±0.02	a 0.21 ±0.05	a 5.31 ±0.74	a 1.53 ±0.01

DAT: Days after transplanting. 0 DAT correspond to 30th April in 2020 or 07th April in 2021. Means ± standard error, *n* = 4. Different letters for the same parameter and DAT indicate significant differences according to Duncan's test₇ (*p* < 0.05).