

Table S1. The four nitrogen fertilizer levels and UAV flight date during first and second crop in 2019.

Year	Cultivar	Crop season	Seedling date	Nitrogen fertilizer date	Nitrogen fertilizer level (kg/ha)	Field sampling date	UAV flight date	Growth stage <sup>z</sup>
2019	TNG71	I	8-Mar	6-Mar	80 (N1)	13-Mar	14-Mar	Seedling
				25-Mar	120 (N2)	3-Apr	2-Apr	Tillering I
				8-Apr	160 (N3)	17-Apr	17-Apr	Tillering II
				8-May	200 (N4)	30-Apr	30-Apr	Max tillering
						15-May	10-May	Booting
						29-May	29-May	Heading
						19-Jun	13-Jun	Filling
		II	26-Jul	17-Jul	80 (N1)	13-Aug	20-Aug	Initial tillering
				14-Aug	120 (N2)	28-Aug	28-Aug	Tillering
				12-Sep	160 (N3)	6-Sep	3-Sep	Max tillering
					200 (N4)	23-Sep	24-Sep	Heading
						7-Oct	7-Oct	Filling I
						21-Oct	21-Oct	Filling II

<sup>z</sup> Tillering I is the initial stage of tillering after the first topdressing; Tillering II is the middle tillering stage after the second topdressing; Filling I is the milk stage during grains fill process; Filling II is the yellow ripe stage during grains fill process.

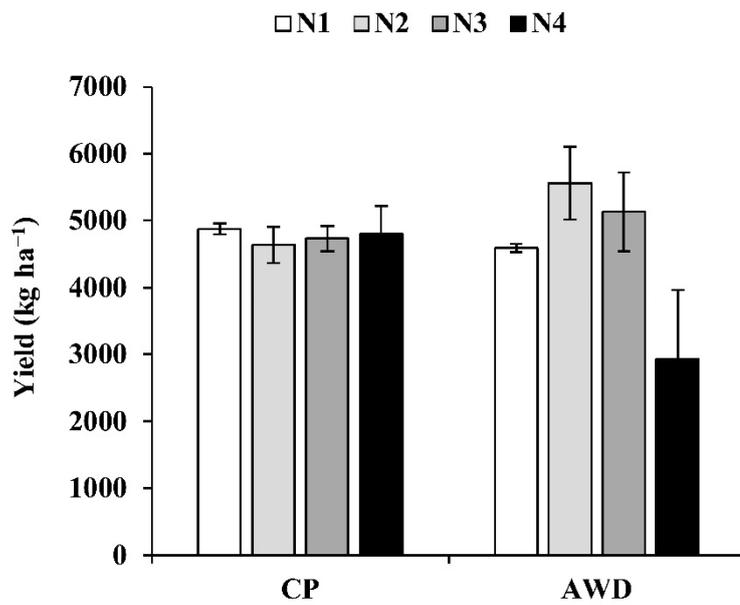
(a)



(b)



Additional file 1: Figure S1. Intelligent sensor for paddy field. (a) water level sensor  
(b) remote intelligent water meter.



Additional file 2: Figure S2. The yields of the early maturing rice TNG71 in the first crop under different water and fertilizer treatments. The amount of fertilizer of TNG71 were 80 kg/ha (N1), 120 kg/ha (N2), 160 kg/ha (N3), and 200 kg/ha (N4). Conventional plant (CP), alternative wet and dry (AWD).

Additional file 3: Table S1. The four nitrogen fertilizer levels and UAV flight date during first and second crop in 2019.