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RESEARCH ARTICLE

Agronomic and environmental evaluation of integrated nutrient management for cabbage production in high-altitude regions

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Table S1 Fertilizer management in the four treatments

Treatment		N (kg·ha^{-1})	P_2O_5 (kg·ha^{-1})	K_2O (kg·ha^{-1})	Organic fertilizer and other fertilizers (kg·ha^{-1})	Planting density (plants ha^{-1})
Total fertilizer	FP	420	300	225	4500 kg Fresh chicken manure	37500
	S1	420	500	225	20 kg Lime nitrogen + 6000 kg mushroom residue and cow manure	37500
	S2	480	360	218	20 kg Lime nitrogen + 6000 kg mushroom residue and cow manure	42000
	S3	375	180	225	20 kg Lime nitrogen + 6000 kg mushroom residue and cow manure + 600 kg slow-release urea + 225 kg superphosphate + 75 kg potassium sulfate	42000
Base-fertilizer	FP	300	300	225		
	S1	300	300	225		
	S2	337.5	337.5	157.5		
	S3	225	180	75		
Top-dress fertilizer 1	FP	120	0	0		
	S1	120	0	0		
	S2	142.5	22.5	60	150 kg Liquid organic fertilizer	
	S3	75	0	75	150 kg Liquid organic fertilizer	
Top-dress fertilizer 2	S2	75	0	75	150 kg Liquid organic fertilizer	
	S3	75	0	75	150 kg Liquid organic fertilizer	

Note: FP is the farmers' practices treatment; S1 is the soil remediation treatment; S2 is the high-yield treatment; S3 is the ISSM treatment

Table S2 Fertilizer nutrient content information

Fertilizer type	Nutrient content ($kg \cdot ha^{-1}$)			
	C	N	P_2O_5	K_2O
Urea		69		
Superphosphate			27	
Potassium sulfate				54
Fresh chicken manure	743	46	18	32
Organic fertilizer of cow dung and fungus residue	2502	70	23	58
Liquid organic fertilizer	1026	96	42	177

Table S3 The emission factor of NO_2, NH_3, NO_2 and NO_3^- for N fertilizer inputs at the arable farming stage (AFS)

Item	Source	Emission factor (%)	Reference source
NO_2	N fertilizer	0.63	[1–4]
NH_3	N fertilizer	0.81	
NO_2	N fertilizer	1.17	
NO_3^-	Inorganic N fertilizer	19.7	[5,6]
NO_3^-	Organic N fertilizer	11.1	[5,6]

Table S4 The emission factor of reactive N (Nr) emission, greenhouse gas (GHG), and water eutrophication emission for agricultural inputs at the agricultural materials stage (AMS)

Item	Nr emission (kg N per unit)	GHG emission (kg CO_2-eq per unit)	Water eutrophication (kg PO_4-eq per unit)	Reference
N fertilizer (kg N)	7.15 E-03	8.30	3.03 E-03	[1,7,8]
P fertilizer (kg P_2O_5)	1.84 E-04	0.79	7.67 E-05	
K fertilizer (kg K_2O)	1.46 E-04	0.55	6.13 E-05	
Pesticides (kg)	4.69 E-03	19.1	1.94 E-03	[9,10]
Diesel (L)	1.97 E-03	3.75	1.19 E-02	[11,12]
Electricity (kWh)	2.81 E-03	0.75	8.40 E-04	[9,12]

Note: N fertilizer included both inorganic N fertilizer and organic N fertilizer.

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