

Supplementary Table 1. The description of sites in this study, including fertilization, density and height of growing plants

Cropping systems		Fertilization	Coverage (%) in 1x1m ²	Height (m)
Wheat-Corn (<i>Triticum aestivum</i> L.- <i>Zea mays</i> L.)		Compound fertilizer 600 kg h ⁻¹ year ⁻¹ + diammonium hydrogen phosphate 550 kg h ⁻¹ year ⁻¹	30-50	0.15-0.2
				0.5-0.7
Cotton (<i>Gossypium hirsutum</i> L.)		Compound fertilizer 300 kg h ⁻¹ year ⁻¹	70-80	
				0.3-0.4
Rice (<i>Oryza sativa</i> L.)		Ammonium sulphate 280 kg h ⁻¹ year ⁻¹ + Potassium chloride100 kg h ⁻¹ year ⁻¹	70-80	
				0.5-0.7
Fruit-Vegetable	Strawberry (<i>Fragaria</i> × <i>ananassa</i> Duch.)	Compound fertilizer 280 kg h ⁻¹ year ⁻¹	70-80	0.15-0.22
	Pepper (<i>Capsicum annuum</i> L.)		60-70	0.4-0.55

Supplementary Table 2. Network properties of *amoA*-AOA and *nirS*-type denitrifier communities.

	cropping system	clustering coefficient	connected components	network diameter	network centralization	characteristic path length	number of nodes	number of edges	network density
<i>amoA</i> -AOA	Wheat-Corn	0.669	4	11	0.171	3.722	44	132	0.14
	Cotton	0.728	4	7	0.149	2.572	46	128	0.124
	Rice	0.7	4	5	0.12	1.748	29	56	0.07
	Soybean-Corn	0.613	8	4	0.07	1.204	31	47	0.101
	Fruit	0.527	5	5	0.077	2.105	38	63	0.09
<i>nirS</i> -type									
denitrifier	Wheat-Corn	0.748	6	3	0.088	1.26	35	73	0.163
	Cotton	0.781	5	4	0.125	1.419	34	70	0.125
	Rice	0.774	4	4	0.157	1.634	22	44	0.19
	Soybean-Corn	0.8	6	1	0.123	1	20	29	0.123
	Fruit	0.952	4	2	0.068	1.065	33	115	0.128