The influence of land use and management on the behaviour and persistence of soil organic carbon in a subtropical Ferralsol

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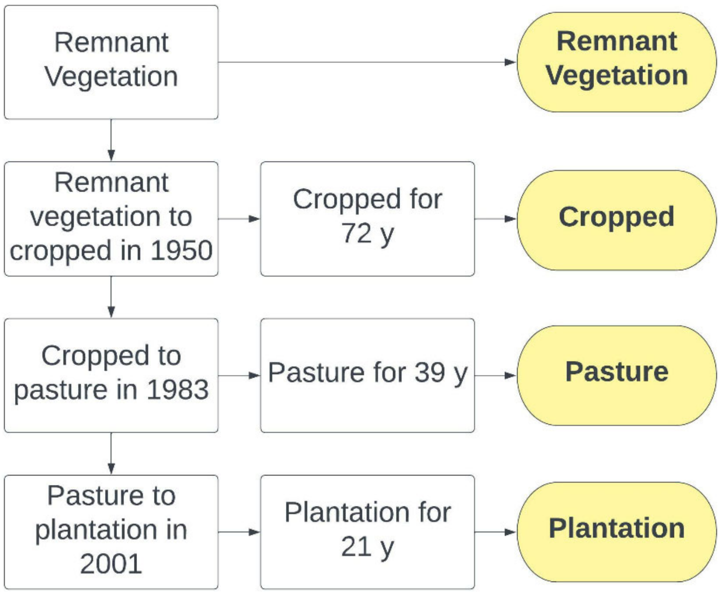
Supplementary Table S1: Background and land use history for the soils collected from Kingaroy adapted from Zhang et al. (2020).

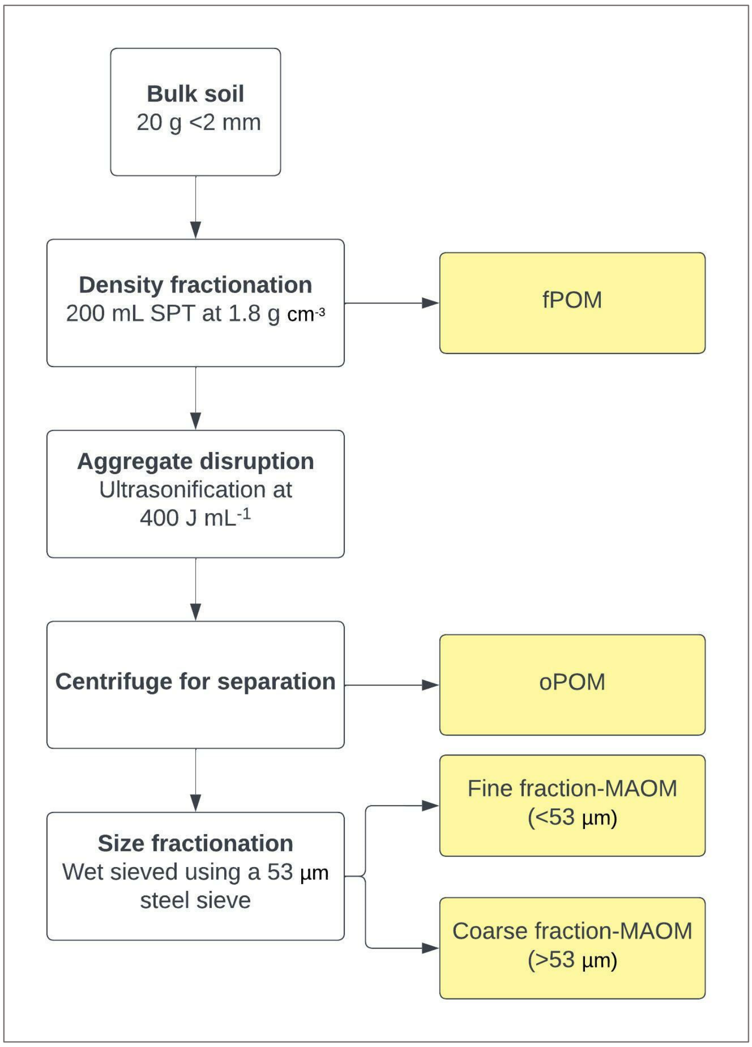
Land Use	**Time since last land use change (y)**	**Vegetation**	**Fertiliser**
Remnant Vegetation	N/A	Native Vine Scrub	N/A
Plantation	21	Spotted gum (*Corymbia citriodora spp. Variegata)*	Nil
Cropped	72	Peanut (*Arachis hypogaea*) – maize (*Zea mays*)	1950–2010: Nil 2010–2017: 50 kg ha^{-1} P ha^{-1} as MOP and 12 kg as diammonium phosphate (DAP) plus Petrik micronutrients at planting for peanuts. 70 kg ha^{-1} urea, 40 kg ha^{-1} P ha^{-1} as MOP and 9.4 kg as DAP, 4 kg ha^{-1} Zn plus Petrik micronutrients at planting for maize.
Pasture	39	Wiregrass (*Aristida ramose*)/ Rhodes grass (*Chloris gayana*)	Nil

Supplementary Table S2: The average concentration of C, N and C/N ratios of each soil fraction from four land uses, separated by density fractionation and elemental concentration determined by IRMS. fPOM is free particulate organic matter, oPOM is aggregate-occluded particulate organic matter, coarse fraction-MAOM is coarse grained (>53 µm) mineral-associated organic matter, and fine fraction-MAOM is fine grained (>53 µm) mineral-associated organic matter. Standard error is reported in parentheses (*n* = 5).

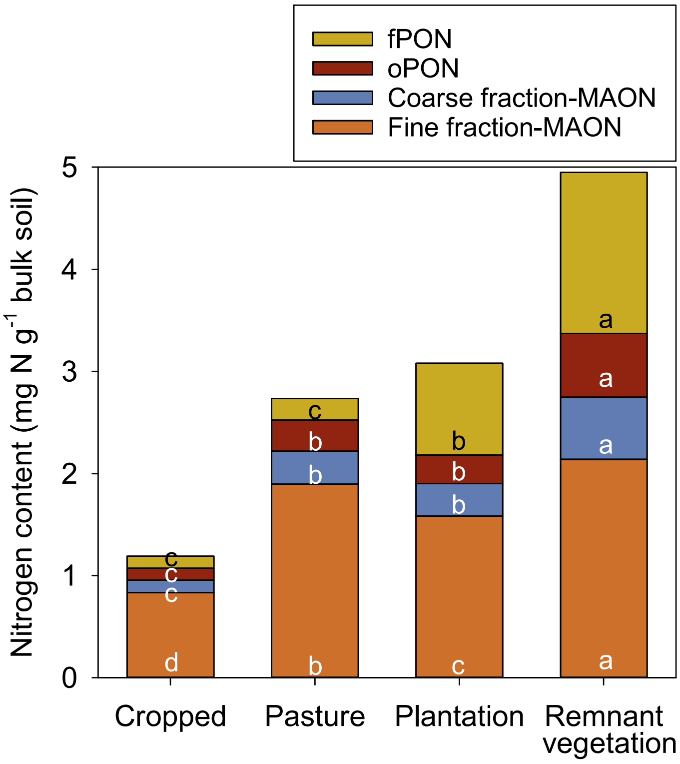
		Land Use			
		Remnant Vegetation	**Pasture**	**Plantation**	**Cropped**
fPOM	C (mg g^{-1})	254 (8.30)	224 (12.4)	225 (13.4)	242 (13.6)
	N (mg g^{-1})	18.1 (0.66)	12.1 (0.71)	11.0 (0.34)	12.1 (1.10)
	C/N ratio	14.1 (0.15)	18.6 (0.67)	20.4 (0.64)	20.5 (1.73)
oPOM	C (mg g^{-1})	361 (13.9)	360 (3.39)	358 (4.77)	383 (7.60)
	N (mg g^{-1})	24.2 (0.61)	23.1 (0.24)	17.9 (0.18)	19.1 (1.07)
	C/N ratio	14.9 (0.25)	15.6 (0.27)	20.0 (0.348)	20.3 (1.33)
Coarse fraction-MAOM	C (mg g^{-1})	15.6 (1.17)	8.38 (1.26)	8.43 (1.16)	2.95 (0.21)
	N (mg g^{-1})	1.25 (0.09)	0.65 (0.09)	0.600 (0.09)	0.225 (0.03)
	C/N ratio	12.5 (0.19)	12.8 (0.29)	14.2 (0.39)	13.3 (0.97)
Fine fraction-MAOM	C (mg g^{-1})	57.5 (0.76)	39.5 (1.58)	47.6 (1.29)	18.3 (0.38)
	N (mg g^{-1})	6.26 (0.11)	4.23 (0.14)	4.75 (0.21)	1.95 (0.03)
	C/N ratio	9.23 (0.06)	9.34 (0.09)	10.0 (0.18)	9.36 (0.09)



Supplementary Figure S1: A Summary of the land use change history of the four land uses sampled from the Kingaroy study site [updated from Zhang et al. (2020)].



Supplementary Figure S2: Density fractionation and size fractionation process used to separate the bulk soil into four fractions: free particulate organic matter (fPOM), aggregate-occluded organic matter (oPOM), coarse mineral-associated organic matter (coarse fraction-MAOM) and fine mineral-associated organic matter (fine fraction-MAOM).



Supplementary Figure S3: The nitrogen content for each soil fraction within the bulk soil from topsoils (0-10cm) collected from four land uses. fPON is free particulate organic nitrogen, oPON is aggregate-occluded particulate organic nitrogen, coarse fraction-MAON is coarse grained (> 53µm) mineral-associated organic nitrogen and coarse fraction-MAON is fine grained (> 53µm) mineral-associated organic nitrogen. Lower-case letters indicate least significant differences (95 % confidence level for each comparison) between the same fractions across land uses.

Supplementary References

Zhang, Y., Bhattacharyya, R., Dalal, R.C., Wang, P., Menzies, N.W., Kopittke, P.M., 2020. Impact of land use change and soil type on total phosphorus and its fractions in soil aggregates. Land Degrad. Dev. 31, 828-841.