

### Supplementary file

**Table S1.** Result of multicollinearity test of different covariates using variance inflation factors analysis. Multiple linear regression (where aboveground carbon is used as response variable) was used where regression started by including all the covariates and gradually removes the variable with the highest variance inflation factor until achieving the threshold value. Covariates with a variance inflation factor below 2 (threshold value) do not imply multicollinearity.

Steps	H	MTH	BA	SD	MDBH
1.00	1.34	2.89	3.56	2.38	5.41
2.00	1.33	1.05	1.32	1.32	NA

H = Shannon Diversity Index, MTH: Mean tree height, BA: Basal Area, SD: Stem Density, MDBH: Mean Diameter at Breast Height.

**Table S2.** Fit statistics of the rejected and accepted structural equation models for predicting different carbon pools in combination of plant diversity and stand structure. The model with an insignificant Chi value ( $\chi^2, p > 0.05$ ) square along with comparative fit index close to one (CFI) and standardized root mean square residual close to zero (SRMR) indicates no significant deviation from the model based off of the observed dataset and, thus, it indicates a good fit.

Response Variable	Predictors	R <sup>2</sup>	chisq	df	p Value	cfi	srmr	Remarks
AGC	H, MTH, BA, SD	0.80	4.83	2	0.09	0.96	0.10	Rejected
AGC	H, MTH, BA	0.80	1.23	1	0.27	1.00	0.07	Accepted
BGC	H, MTH, BA, SD	0.80	4.83	2	0.09	0.96	0.10	Rejected
BGC	H, MTH, BA	0.80	1.23	1	0.27	1.00	0.07	Accepted
SOC1	H, MTH, BA, SD	0.27	4.83	2	0.09	0.87	0.08	Rejected
SOC1	H, MTH, BA	0.27	1.23	1	0.27	0.98	0.05	Accepted
SOC2	H, MTH, BA, SD	0.04	4.83	2	0.09	0.75	0.08	Rejected
SOC2	H, MTH, BA	0.04	1.23	1	0.27	0.94	0.05	Accepted
TBC	H, MTH, BA, SD	0.80	4.83	2	0.09	0.96	0.10	Rejected
TBC	H, MTH, BA	0.80	1.23	1	0.27	1.00	0.07	Accepted
TSOC	H, MTH, BA, SD	0.19	4.83	2	0.09	0.84	0.08	Rejected
TSOC	H, MTH, BA	0.19	1.23	1	0.27	0.98	0.05	Accepted
Total Carbon	H, MTH, BA, SD	0.61	4.83	2	0.09	0.94	0.09	Rejected
Total Carbon	H, MTH, BA	0.61	1.23	1	0.27	1.00	0.06	Accepted

H = Shannon Diversity Index, MTH: Mean tree height, BA: Basal Area, SD: Stem Density, AGC: Aboveground biomass Carbon, BGC: Belowground biomass Carbon, SOC1 = Soil Organic Carbon at 0–15 cm depth, SOC2 = Soil Organic Carbon at 15–30 cm, TBC = Total Biomass Carbon (AGC + BGC), TSOC= Total Soil Organic Carbon (0–30 cm).