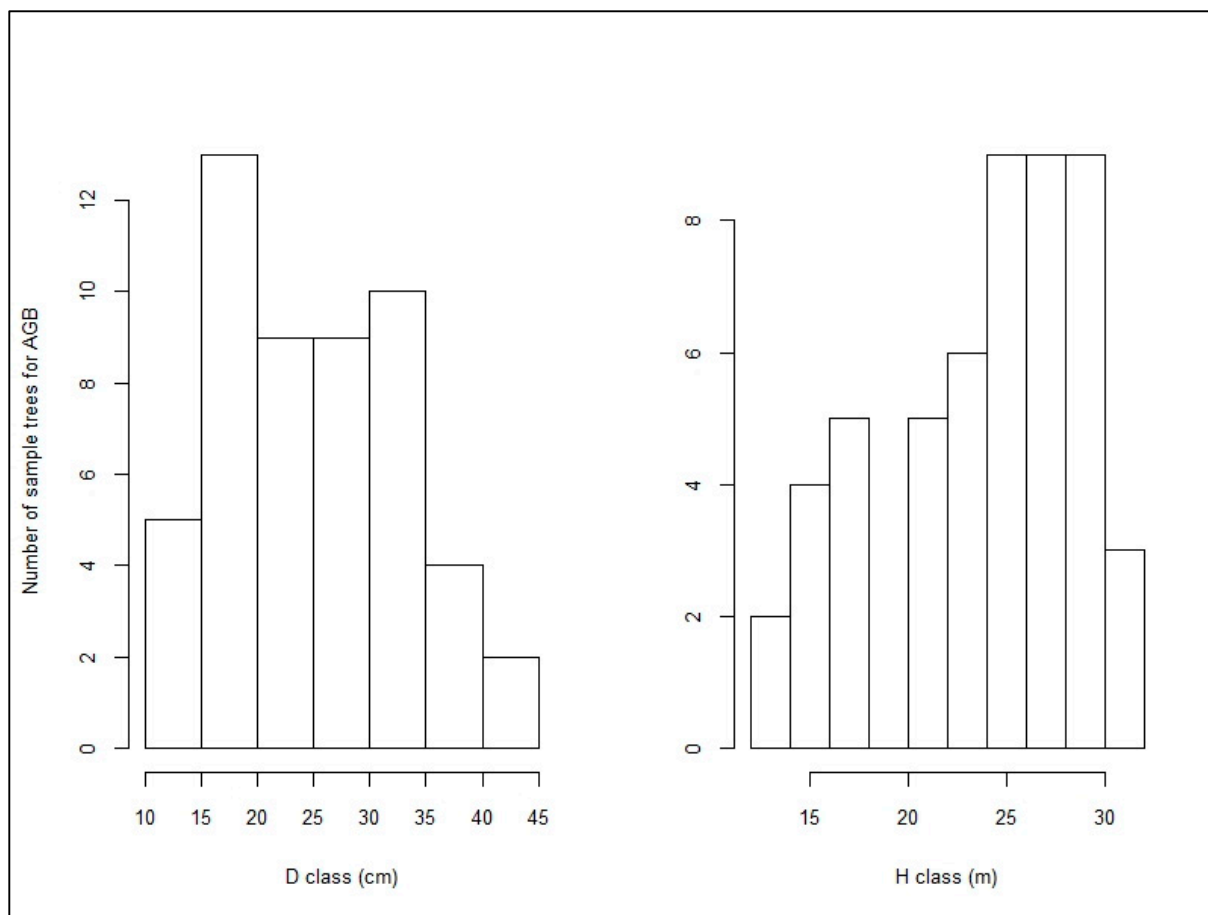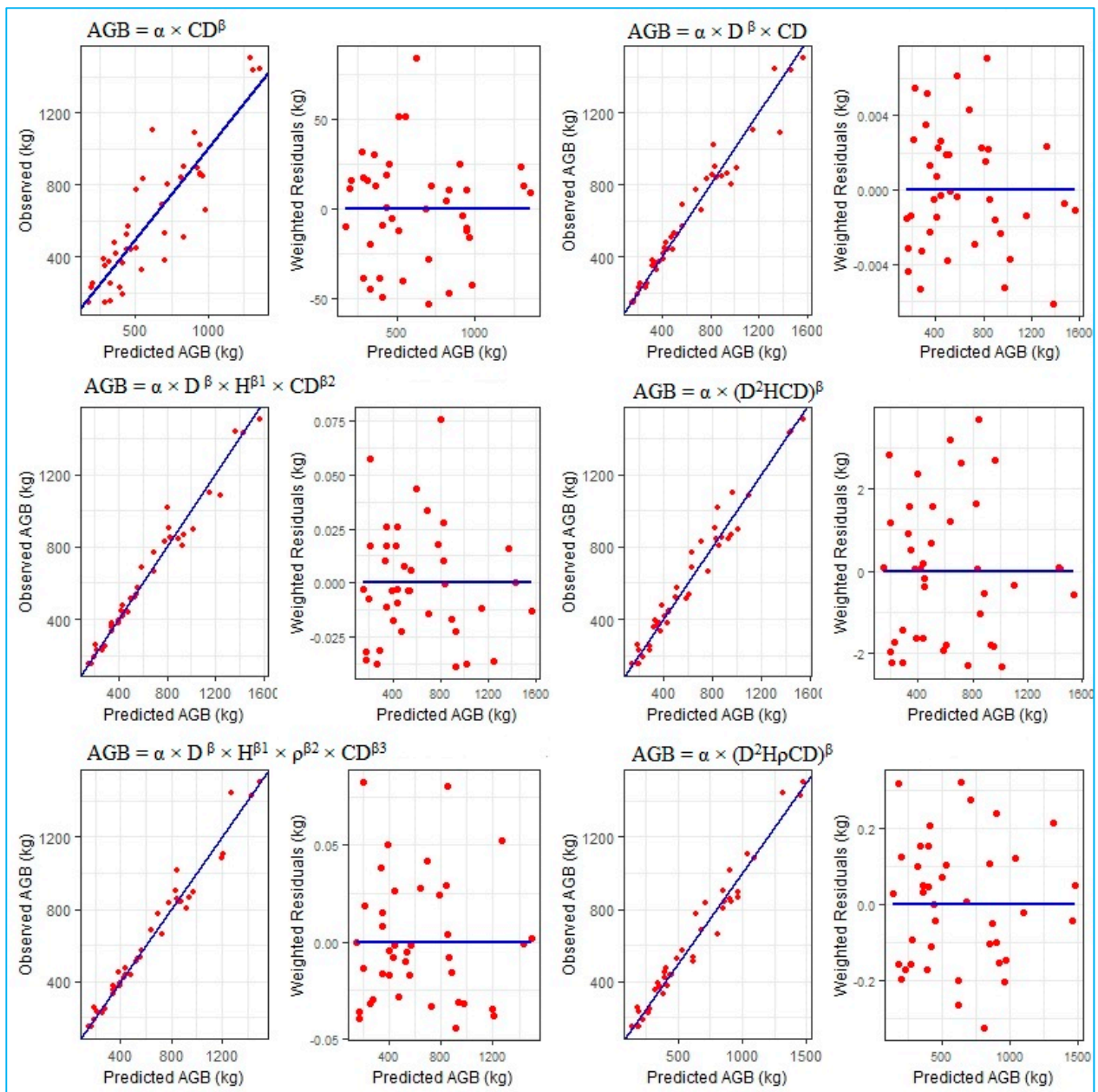# Supplementary Figure and Table

Table S1. The Furnival's Index (FI) [1-3] was used to compare logarithmically transformed models and weighted nonlinear models. The lower FI indicated more reliable models.
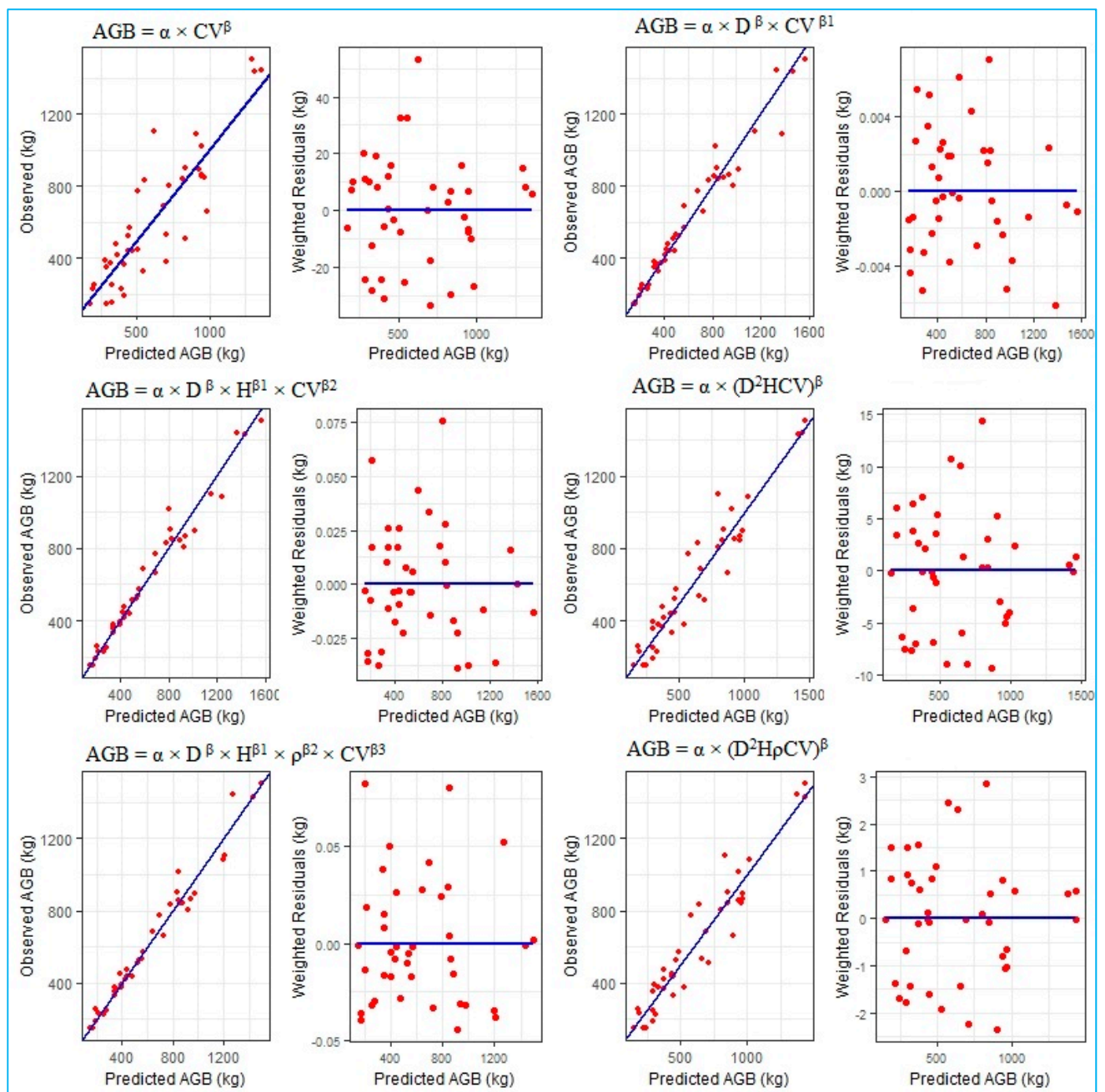
Equation. No	Model form	FI	
		Log-linear model	Weighted nonlinear model
(3)	AGB = $\alpha \times D^\beta$	40.4	0.0200
(4)	AGB = $\alpha \times H^\beta$	128.7	0.0034
(5)	AGB = $\alpha \times D^\beta \times H^{\beta 1}$	38.5	0.0316
(6)	AGB = $\alpha \times D^2 H^\beta$	45.1	0.0500
(7)	AGB = $\alpha \times D^\beta \times \rho^{\beta 1}$	37.8	0.0316
(8)	AGB = $\alpha \times D^\beta \times H^{\beta 1} \times \rho^{\beta 2}$	36.7	0.0248
(9)	AGB = $\alpha \times D^2 H \rho^\beta$	45.1	0.0004

Figure S1. Distribution of diameter at breast height (left) and total height (right) of 52 sample trees used to develop biomass equations.

Figure S2a. Plots of biomass estimation models based on data set 2a. With compound predictor variables of D, H, ρ and CD for 40 samples trees. See table 4 for criteria associated with these regressions.

Figure S2b. Plots of biomass estimation models based on data set 2b. With compound predictors variable of D, H, ρ and CV for 40 samples trees. See table 4 for criteria associated with these regressions.

Table S2. Average predicted error of biomass equations using Monte Carlo cross-validation (MCCV), the procedure was used 80% data used for training, 20% data for testing, the process is repeated 100 times for Equation (3) – Eq. (9) and 40 times for Equation (10) – Eq. (23).

Equation No.	Model form	AIC	Adj. R^2	Bias (%)	RMSE (kg)	MAPE (%)
	Model set 1: MCCV = 100 times, n = 52 trees					
(3)	$AGB = \alpha \times D^\beta$	434.4	0.823	-2.2	0.115	7.2
(4)	$AGB = \alpha \times H^\beta$	533.1	0.642	-41.7	0.679	55.3
(5)	$AGB = \alpha \times D^\beta \times H^{\beta 1}$	441.1	0.923	-3.4	0.099	7.3
(6)	$AGB = \alpha \times (D^2 H)^\beta$	447.6	0.972	-8.4	0.126	10.6
(7)	$AGB = \alpha \times D^\beta \times \rho^{\beta 1}$	438.4	0.922	-3.3	0.104	6.5
(8)	$AGB = \alpha \times D^\beta \times H^{\beta 1} \times \rho^{\beta 2}$	447.8	0.953	-4.1	0.094	6.5
(9)	$AGB = \alpha \times (D^2 H \rho)^\beta$	454.2	0.958	-10.9	0.138	11.4
	Model set 2a: MCCV = 40 times, n = 40 trees					
(10)	$AGB = \alpha \times D^\beta$	357.2	0.880	-6.0	0.114	6.8
(11)	$AGB = \alpha \times H^\beta$	444.1	0.625	-15.8	0.210	18.2
(12)	$AGB = \alpha \times CD^\beta$	430.4	0.964	-6.5	0.428	25.4
(13)	$AGB = \alpha \times D^\beta \times CD^{\beta 1}$	365.0	0.826	-6.2	0.126	7.1
(14)	$AGB = \alpha \times D^\beta \times H^{\beta 1} \times CD^{\beta 2}$	376.9	0.877	-4.8	0.093	7.5
(15)	$AGB = \alpha \times (D^2 HCD)^\beta$	373.8	0.964	-3.4	0.124	7.7
(16)	$AGB = \alpha \times D^\beta \times H^{\beta 1} \times \rho^{\beta 2} \times CD^{\beta 3}$	381.7	0.927	-4.3	0.096	8.5
(17)	$AGB = \alpha \times (D^2 H \rho CD)^\beta$	370.0	0.963	-3.1	0.189	13.3
	Model set 2b: MCCV = 40 times, n = 40 trees					
(18)	$AGB = \alpha \times CV^\beta$	428.3	0.964	-14.8	0.348	23.1
(19)	$AGB = \alpha \times D^\beta \times CV^{\beta 1}$	366.6	0.925	-6.2	0.140	11.0
(20)	$AGB = \alpha \times D^\beta \times H^{\beta 1} \times CV^{\beta 2}$	373.4	0.875	-4.8	0.144	11.3
(21)	$AGB = \alpha \times (D^2 HCV)^\beta$	402.9	0.964	-3.7	0.153	11.0
(22)	$AGB = \alpha \times D^\beta \times H^{\beta 1} \times \rho^{\beta 2} \times CV^{\beta 3}$	369.1	0.927	-4.3	0.140	10.7
(23)	$AGB = \alpha \times (D^2 H \rho CV)^\beta$	401.4	0.964	-3.6	0.153	17.1

Table S3. Comparison of average errors of Equation (3) in this study and published AGB models for eucalypt species

Reference	Forest type	Site	Species	Bias	RMSE	MAPE
This study (2022), Equation (3)	Plantation forests	Southeast Queensland, Australia	Spotted gum (*Corymbia. citriodora* subspecies *variegata*)	-2.0	0.1	10.4
Paul et al. (2016) [4]	Managed and natural woody ecosystems	Across Australia	Mixed hardwood species: *Eucalyptus*, *Corymbia* and *Angophora* spp.	23.9	0.3	25.4
Ximenes et al. (2006) [5]	Native forests	Southern coast of NSW, Australia	Spotted gum (*Corymbia maculata*)	18.6	0.2	18.8
Williams et al. (2005) [6]	Tropical and subtropical eucalypt woodlands	NT, Queensland and New South Wales, Australia	*Eucalypts* spp.	-30.9	0.2	30.9
van Niekerk et al. (2020 [7]	Plantation forests	South-eastern Mpumalanga, South Africa	*E. grandis* and *E. nitens*	21.8	0.2	21.8

References

1.   Furnival, G.M., *An index for comparing equations used in constructing volume tables.* Forest Science, 1961. **7**(4): p. 337-341.
2.   Moore, J.R., *Allometric equations to predict the total above-ground biomass of radiata pine trees.* Annals of Forest Science, 2010. **67**(8): p. 806.
3.   Fordjour, P. and Z. Rahmad, *Development of allometric equation for estimating above-ground liana biomass in tropical primary and secondary forest, Malaysia.* International Journal of Ecology, 2013: p. 1-8.
4.   Paul, K.I., et al., *Testing the generality of above-ground biomass allometry across plant functional types at the continent scale.* Global change biology, 2016. **22**(6): p. 2106-2124.
5.   Ximenes, F.A., W.D. Gardner, and G.P. Richards, *Total above-ground biomass and biomass in commercial logs following the harvest of spotted gum (Corymbia maculata) forests of SE NSW.* Australian Forestry, 2006. **69**(3): p. 213-222.
6.   Williams, R.J., et al., *Allometry for estimating aboveground tree biomass in tropical and subtropical eucalypt woodlands: towards general predictive equations.* Australian Journal of Botany, 2005. **53**(7): p. 607-619.
7.   van Niekerk, P.B., et al., *Allometric relationships to predict aboveground biomass of 8–10-year-old Eucalyptus grandis × E. nitens in south-eastern Mpumalanga, South Africa.* Southern Forests: a Journal of Forest Science, 2020. **82**(1): p. 15-23.