High-Resolution Mapping of Soil Depth in Sri Lanka using an Ensemble of Machine Learning Models

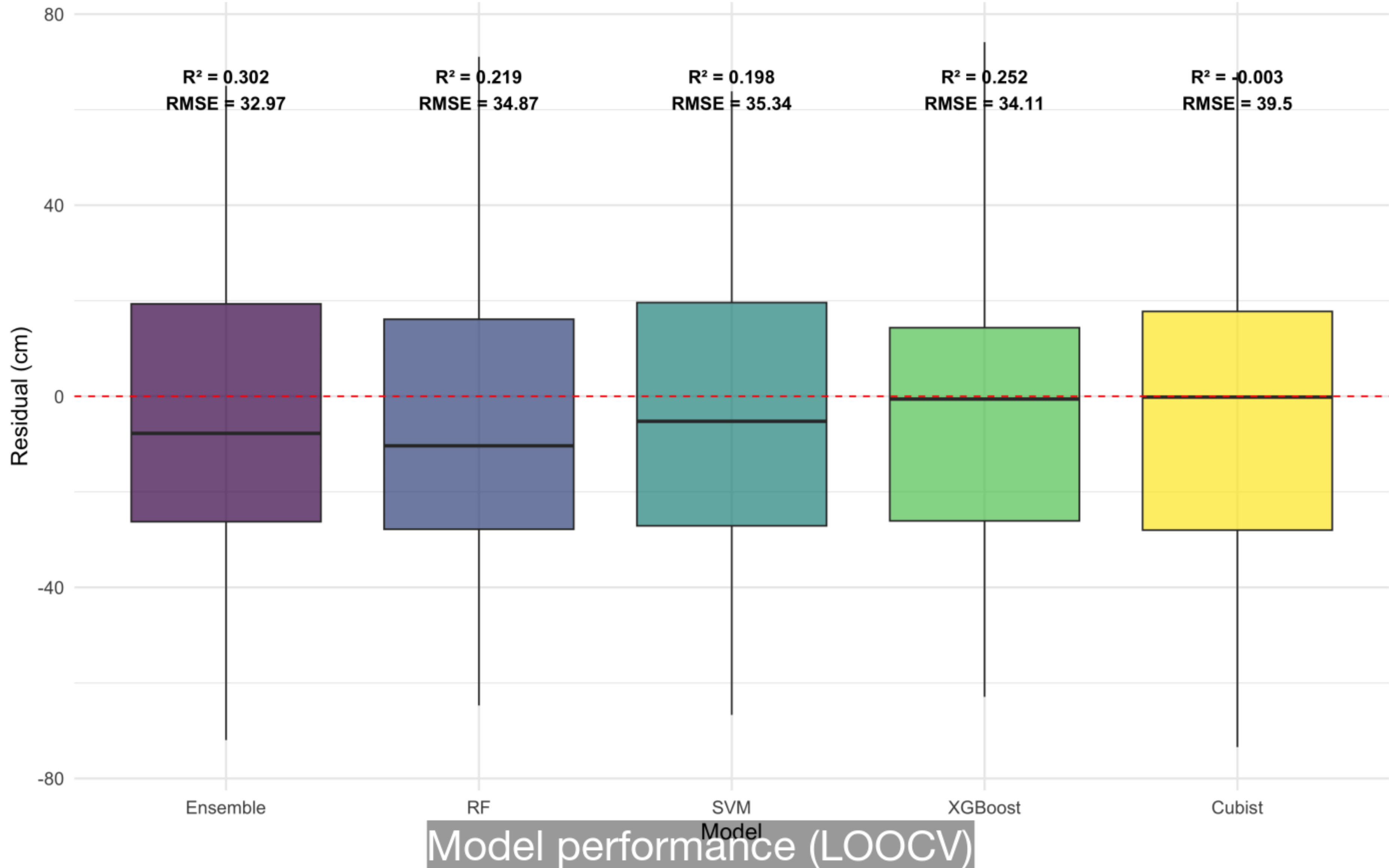

A **Study Area and Soil Sample Locations**
Sri Lanka (n = 96)

Study area and sample locations

B **Final Predicted Soil Depth of Sri Lanka**
Based on a stacked ensemble of four machine learning models

Soil Depth (cm)
200
150
100
50
0
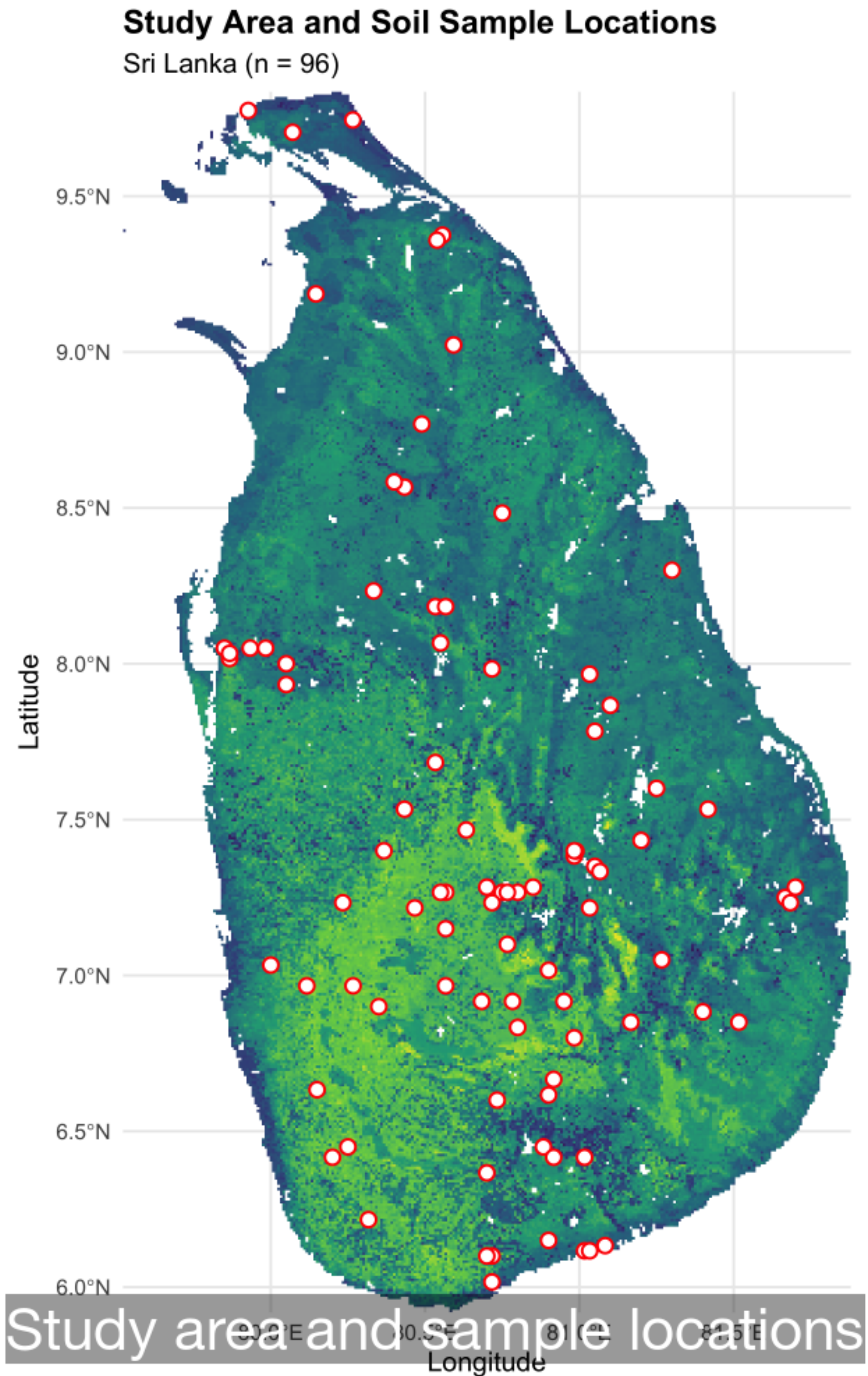
Final ensemble soil depth (DTB)
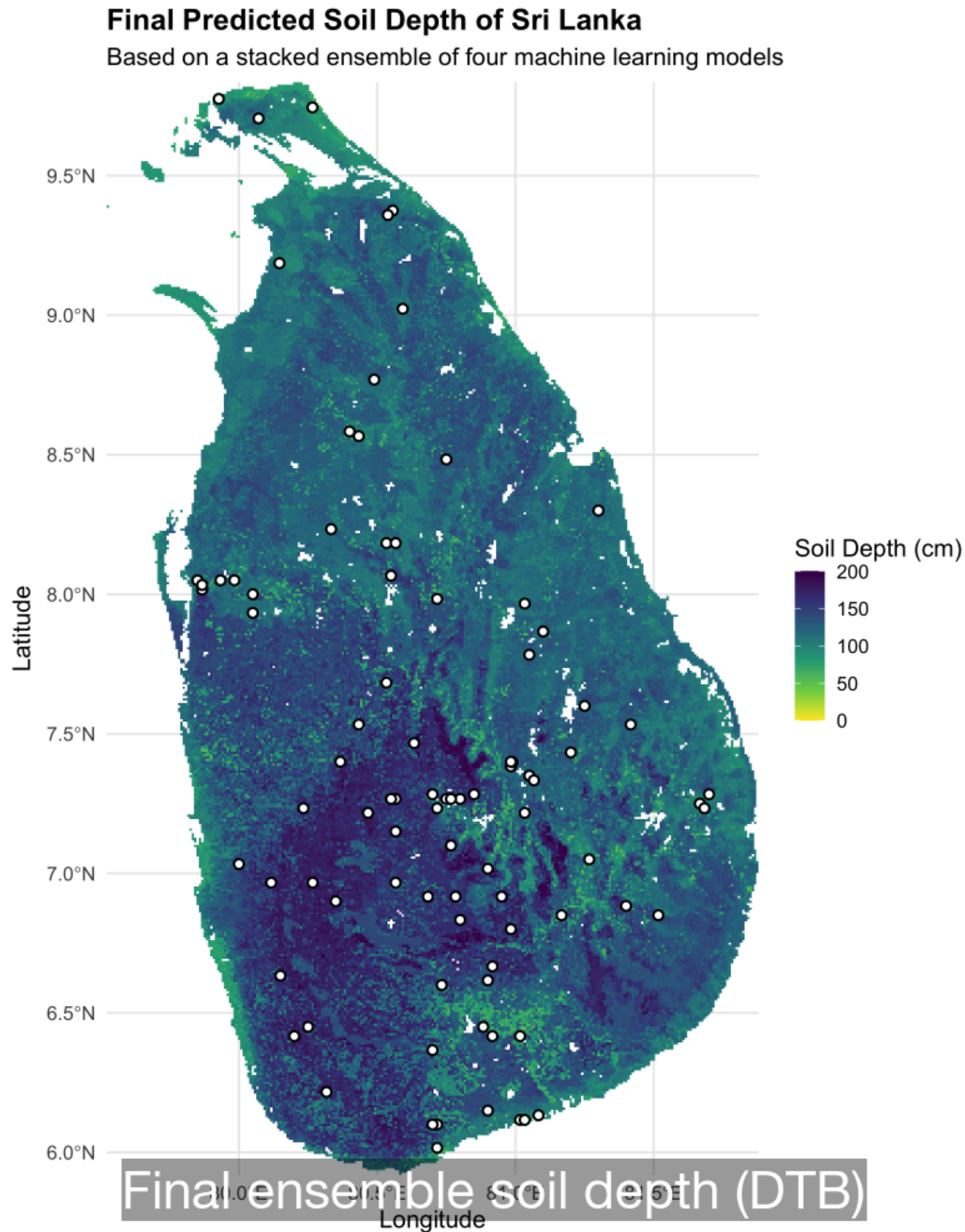
C **Model Performance Comparison (Leave-One-Out Cross-Validation)**
Distribution of prediction residuals

R² = 0.302
RMSE = 32.97

R² = 0.219
RMSE = 34.87

R² = 0.198
RMSE = 35.34

R² = 0.252
RMSE = 34.11

R² = -0.003
RMSE = 39.5

Ensemble   RF   SVM   XGBoost   Cubist

Model performance (LOOCV)

D Top 24 covariates: **Top Covariates (Feature Selection)**

P04CHE3	PRSCHE3
C07MCF5	DEMENV5
P05CHE3	P09CHE3
M09MOD4	P07CHE3
T09MOD3	CRVMRG5
P06CHE3	C05MCF5
C12MCF5	EX6MOD5
M04MOD4	C11MCF5
MANMCF5	C03MCF5
B13CHE3	P10CHE3
C04MCF5	C01MCF5
C06MCF5	T08MOD3

Top covariates: feature importance