Table S1: Allometric Equations (Ismail et al., 2018)

Specie	Biomass Equation	Height Equation
Pinus roxburghii	$Y = 0.0224(D^{\wedge 2} \times H)^{0.9767}$	H= -0.0044* D^2 + 0.6863*D-0.7196
Pinus wallichiana	$Y = 0.0631 * (D^\wedge 2 \times H)\ ^{\wedge 0.8798}$	H= -28.244 + 14.456lnD
Picea smithiana	$Y = 0.0843 * (D^\wedge 2 \times H)\ ^{\wedge 0.8472}$	H= -23.491 + 12.555lnD
Abies pindrow	$Y = 0.0954 * (D^\wedge 2 \times H)\ ^{\wedge 0.8114}$	H= -11.394 + 9.727lnD
Cedrus deodara	$Y = 0.1779 * (D^\wedge 2 \times H)\ ^{\wedge 0.8103}$	H= -34.394 +15.355 lnD
Quercus incana	$Y = 0.8227 * (D^\wedge 2 \times H)\ ^{\wedge 0.6655}$	H= 0.1424D+ 2.6532
Where; Y is the dry biomass in Kgs; D is DBH in cm; H is tree height in meters; Ln is the natural log.		

Supplementary Table S1 showed Allometric equations used for estimation of above ground biomass (AGB) of field data. Allometric equations for tree height (in meters) and AGB (in kg) of *Pinus roxburghii, Pinus wallichiana, Picea smithiana, Abies pindrow, Cedrus deodara* and *Quercus incana* were developed by Forestry Research Division, Pakistan Forest Institute Peshawar Pakistan (Ismail et al., 2018).

Table S2 Correlation Matrix- Geo-statistical Variables

	Biomass	River	Road	Settlements	Streams	Elevation	Aspect	Slope	ARVI	Temperature	Precipitation
Biomass	1	-0.03	-0.24	0.28*	-0.04	0.09	-0.17	0.07	0.43**	-0.16	0.27*
River	-0.03	1	0.06	-0.04	0.3*	0.05	-0.05	0.13	0.04	0.06	0.13**
Road	-0.24	0.06	1	-0.12	0.19	-0.24	0.02	0.05	-0.2	0.41**	-0.6
Settlements	0.28	-0.04	-0.12	1	-0.25	-0.22	0.07	0.25	0.29*	0.19	0.22
Streams	-0.04*	0.3	0.19	-0.25	1	0.02	-0.13	-0.2	0.08	0.13	-0.26
Elevation	0.09	0.05*	-0.24	-0.22	0.02	1	0.01	-0.39	0	-0.9**	0.61**
Aspect	-0.17	-0.05	0.02	0.07	-0.13	0.01	1	0.17	-0.11	0.07	-0.12*
Slope	0.07	0.13	0.05	0.25	-0.2	-0.39**	0.17	1	0.26*	0.36**	-0.1
Arvi	0.43**	0.04	-0.2	0.29*	0.08	0	-0.11	0.26	1	-0.08	0.32*
Temp	-0.16	0.06	0.41	0.19**	0.13	-0.9**	0.07	0.36	-0.08	1	-0.71**
Precipitation	0.27*	0.13	-0.6	0.22**	-0.26*	0.61**	-0.12	-0.1	0.32*	-0.71**	1

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

Supplementary Table S2 showed correlation of AGB versus explanatory variables which include demographic, bioclimatic, topographic variables and Sentinel-2 vegetation index. Different variables were selected for geostatistical analysis (kriging). Demographic variables were distance from road, settlements, streams, rivers while bioclimatic variables include mean annual temperature and annual precipitation. Similarly, topographic variables include elevation, slope and aspect whereas Atmospherically Resistant Vegetation Index (ARVI) derived from Sentinel-2 Image.

Sentinel-2A Image

Supplementary Figure S1 showed subset of Sentinel-2A image which has been used in the present research. The acquired Sentinel-2A image was cloud free (good quality) and represents spatial distribution of vegetation cover of the study area.

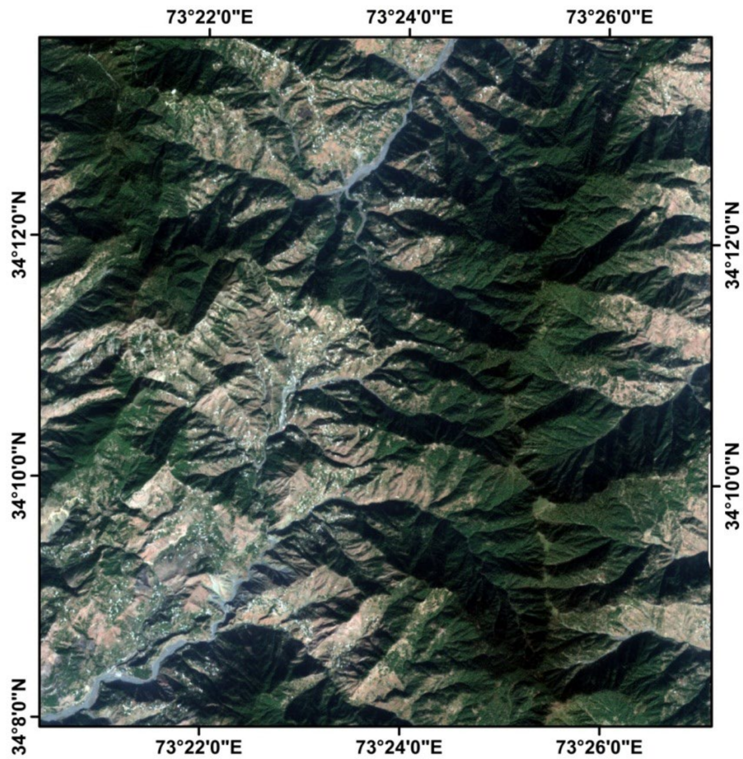

Figure S1: Sentinel-2 Image

Sentinel-2 Vegetation Indices

Supplementary Figure S2 showed vegetation indices derived from Sentinel-2A image which include broadband indices, narrowband indices, canopy water indices and light use efficiency index. Broadband indices include NDVI, NNIR, MSR and RSR whereas narrowband include ARVI, RENDVI and S2REP. Similarly, NDWI, NDII and SIPI were canopy water indices.

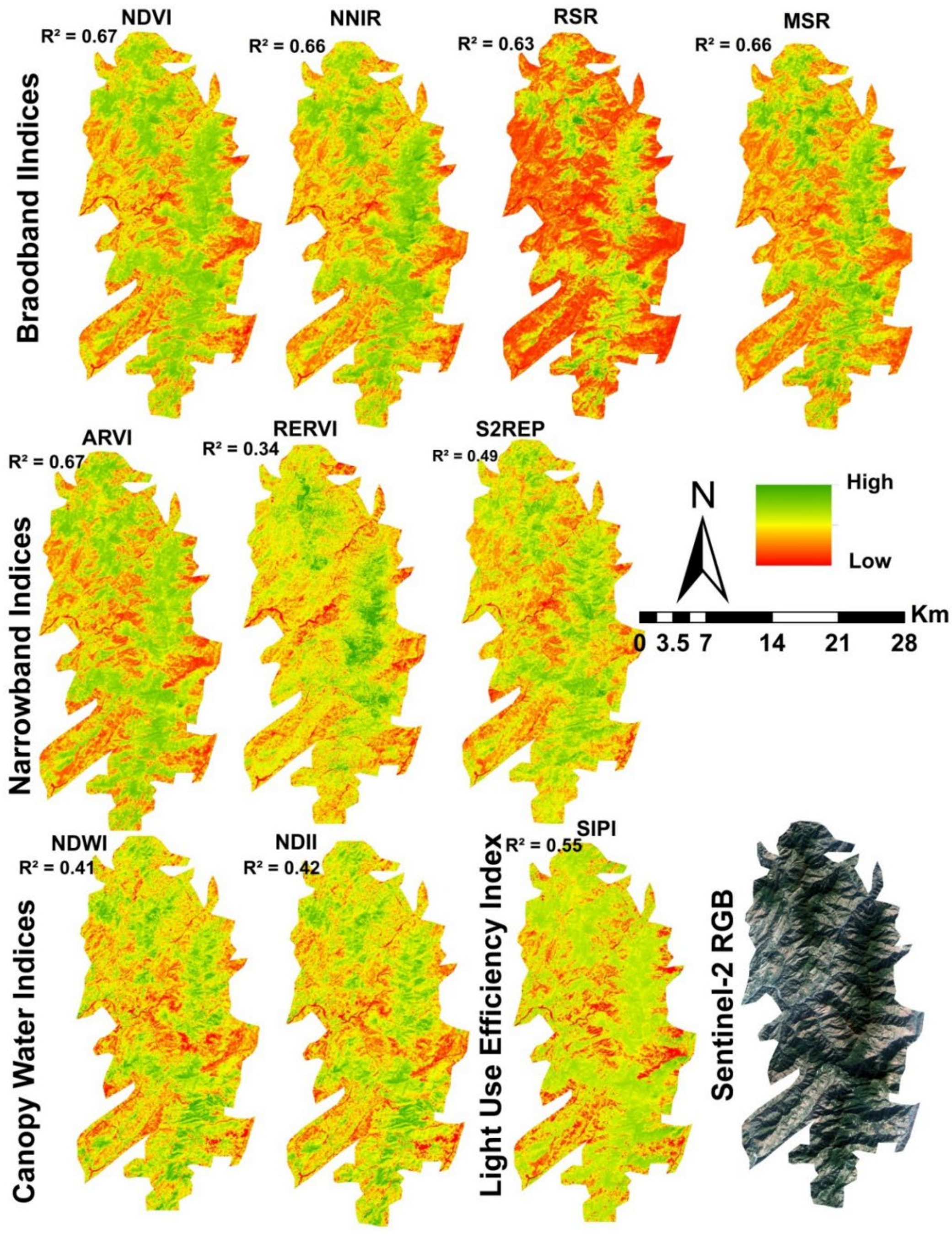

Figure S2: Sentinel-2 Vegetation Indices

Correlation between spectral bands and indices versus AGB

Supplementary Figure S3 showed correlation between spectral bands and indices against AGB. Spectral indices NDVI, ARVI, NNIR, RSR, MSR, S2REP and SIPI showed significant relationships with AGB whereas RENDVI, NDII and NDWI showed weak and non-significant relationships with AGB. Similarly, spectral bands B1, B2 and B4 showed good correlation with AGB whereas spectral bands B3, B5, B11 and B12 showed weak correlation with AGB

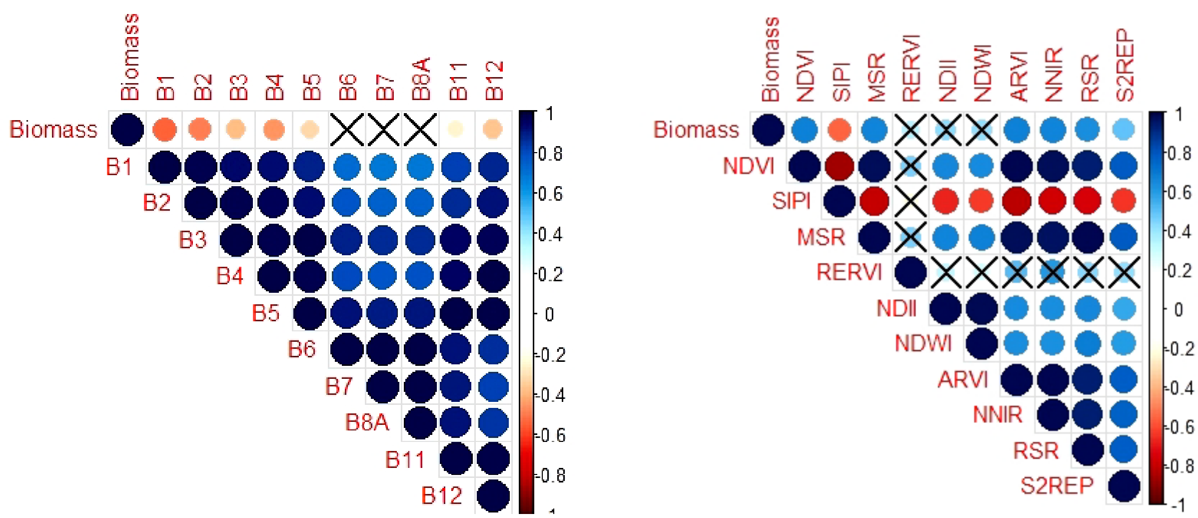

Figure S3: Correlation between spectral bands and indices versus AGB

Correlation of Sentinel-2 AGB models and global forest cover maps

Supplementary Figure S3 showed relationships of Sentinel-2 AGB models with global forest cover maps (Global Forest Cover Change developed by Hansen *et al.,* 2013 and Global Forest Canopy Height Map developed by Simard *et al.,* 2011). Both AGB models (MLR bands and SWLR indices) showed good correlation with Global Forest Cover Change Map as compared to Global Canopy Height Map which showed weak correlation.

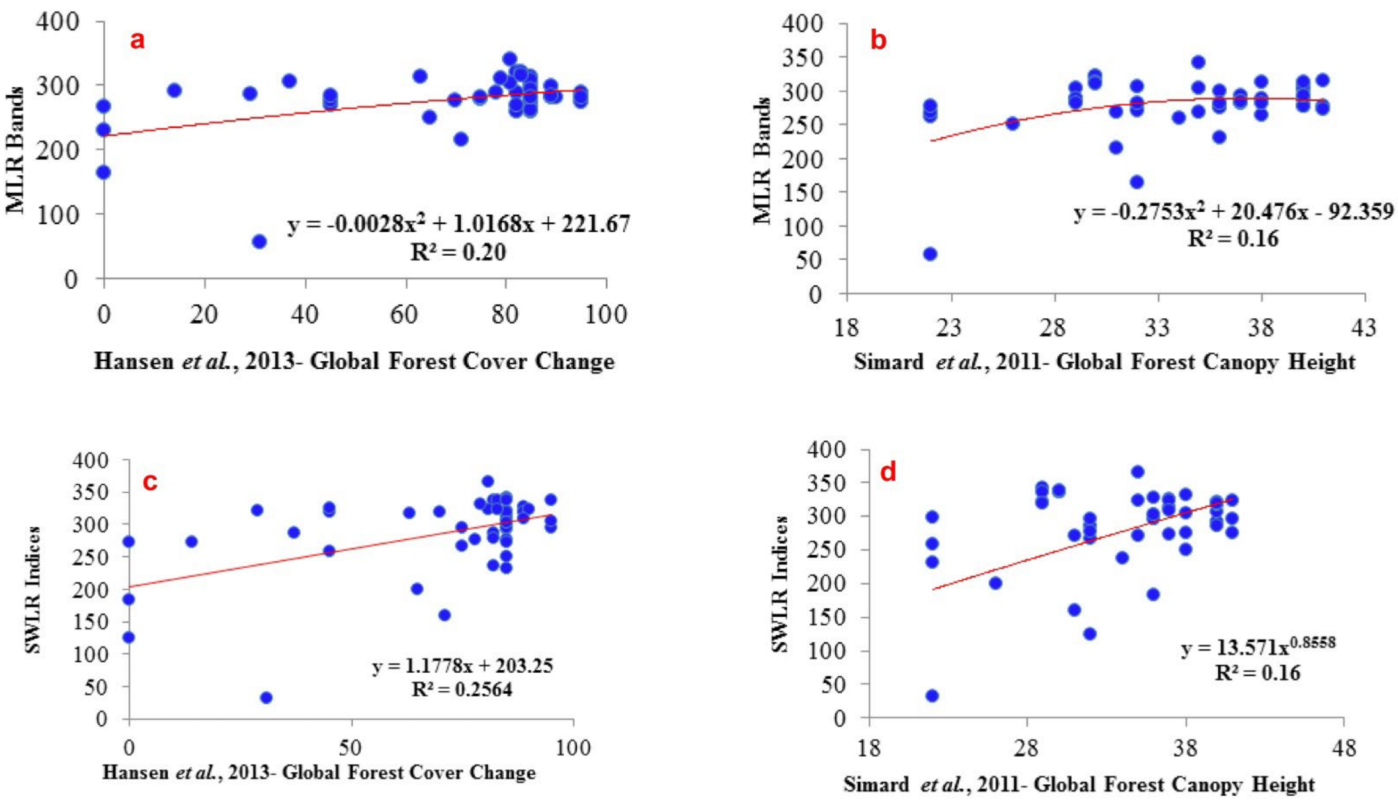

Figure S4 (a,b,c,d): Correlation of Sentinel-2 AGB models and global forest cover maps.