remote sensing

MDPI

Supplementary Materials

Crop Biomass Mapping Based on Ecosystem Modeling at Regional Scale using High Resolution Sentinel-2 Data

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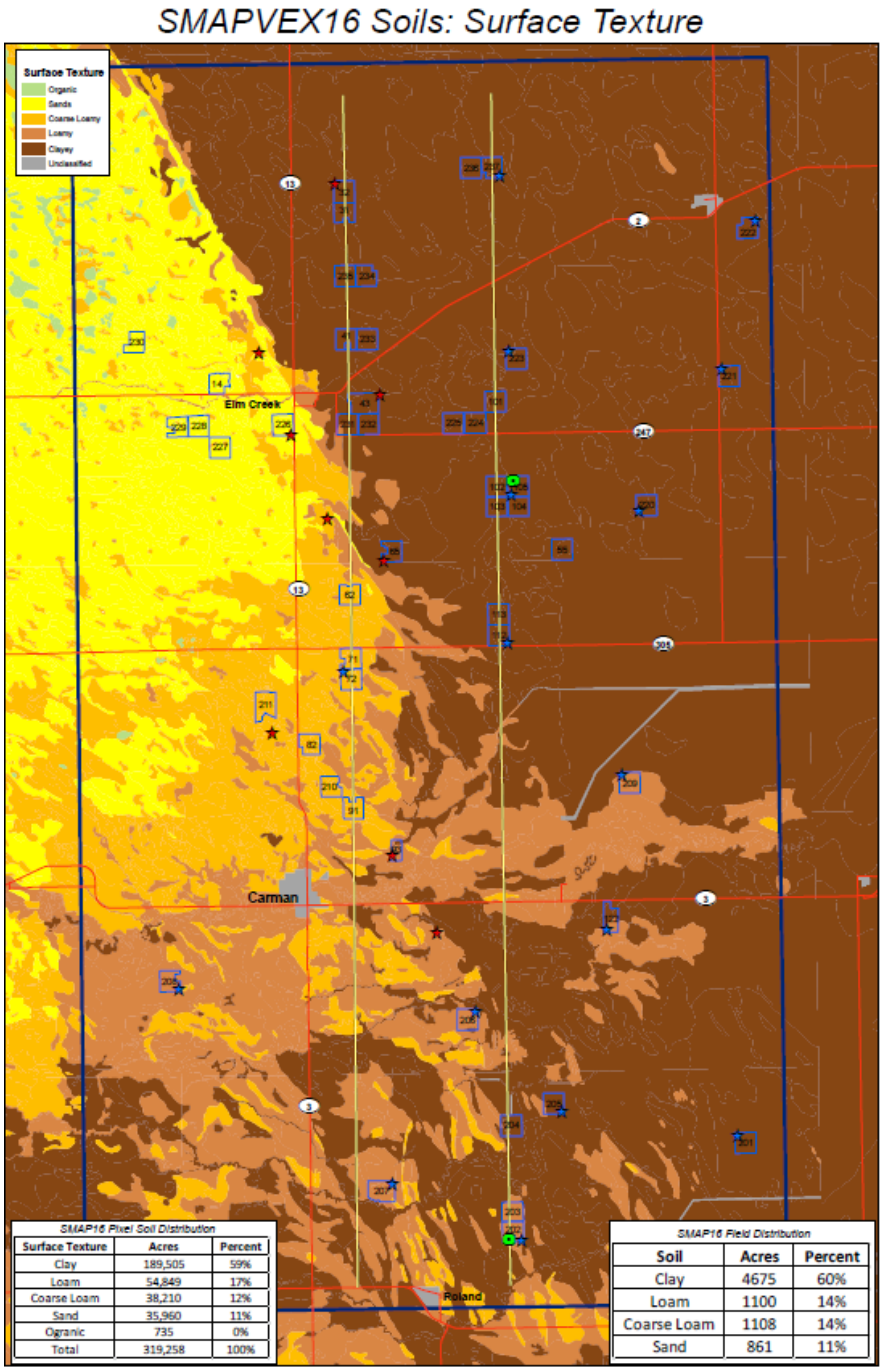
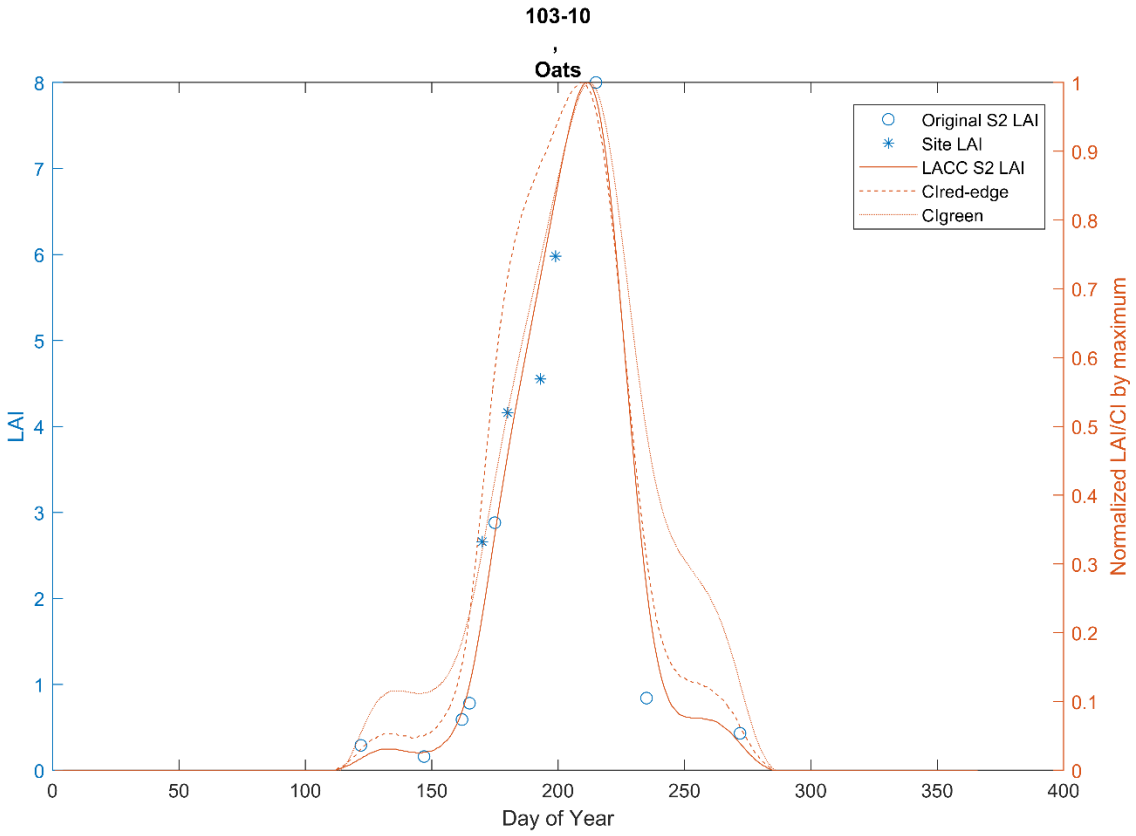
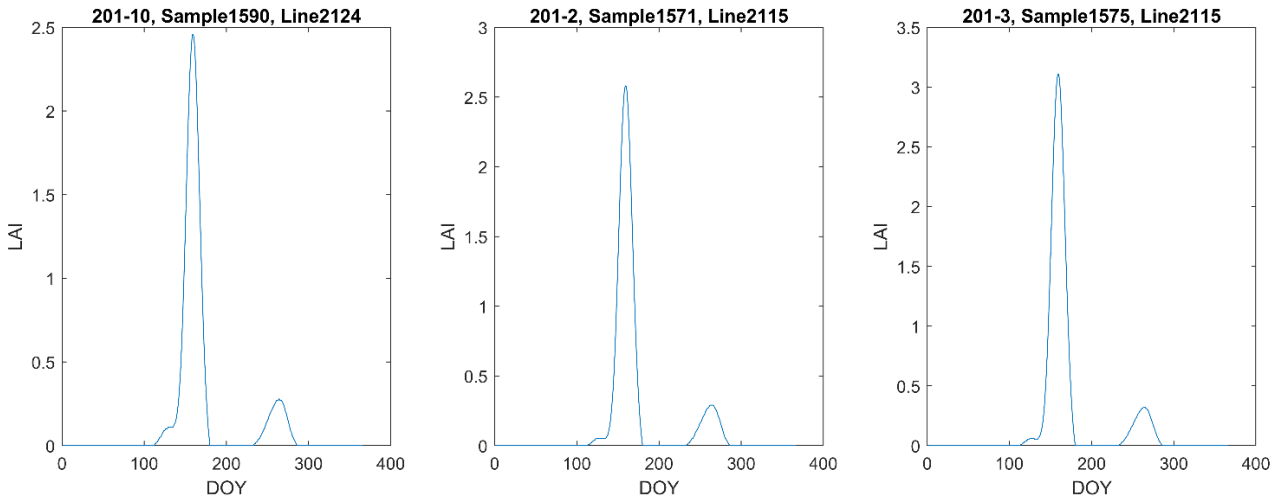


Figure S1. Soil texture at the SMAPVEX16 field campaign. The upper-right part of study area is associated with clay soil and low GPP.



(a)



(b)

Figure S2. a) Successful smoothing of LAI time-series derived from Sentinel-2; (b) Unsuccessful LAI smoothing due to missing of LAI data in the growing season (August) in 2016. According to the harvest schedule in Canada, the LAI values in the peak growing season (July and August) should be very high. There is no site measured LAI after DOY 200, 2016.

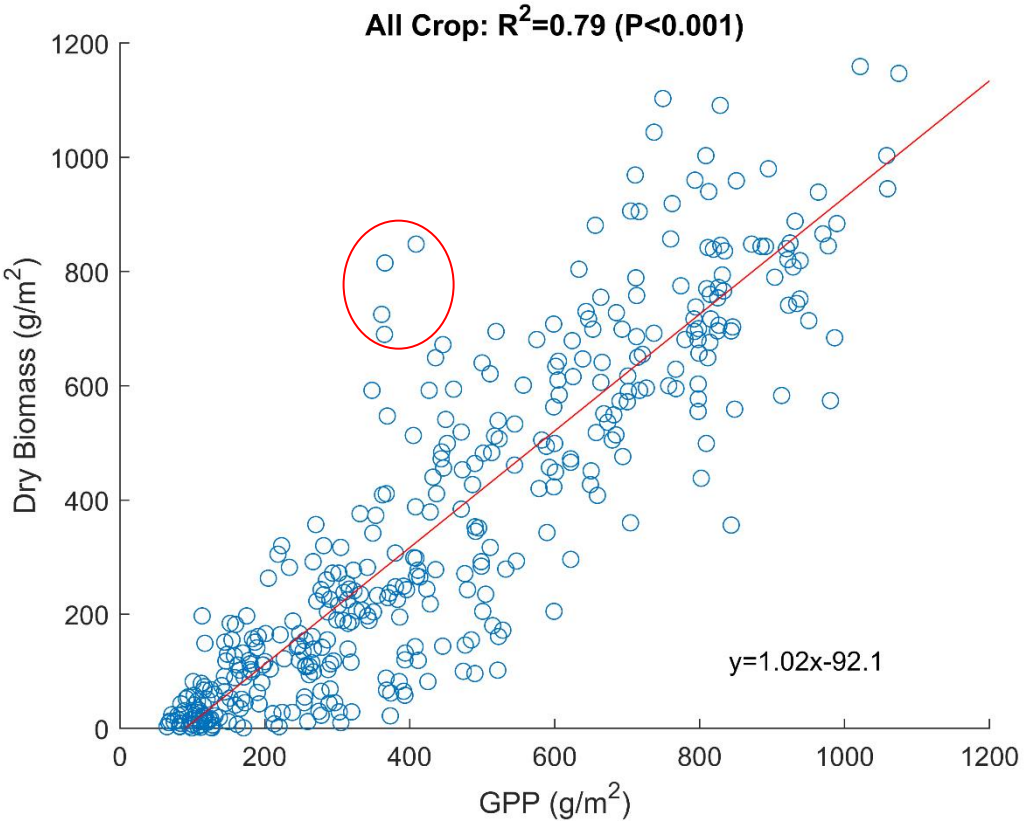


Figure S3. BEPS-simulated crop GPP vs. above-ground biomass for all crop types in the study area including these fields with wrong LAIs as shown in the red circle.

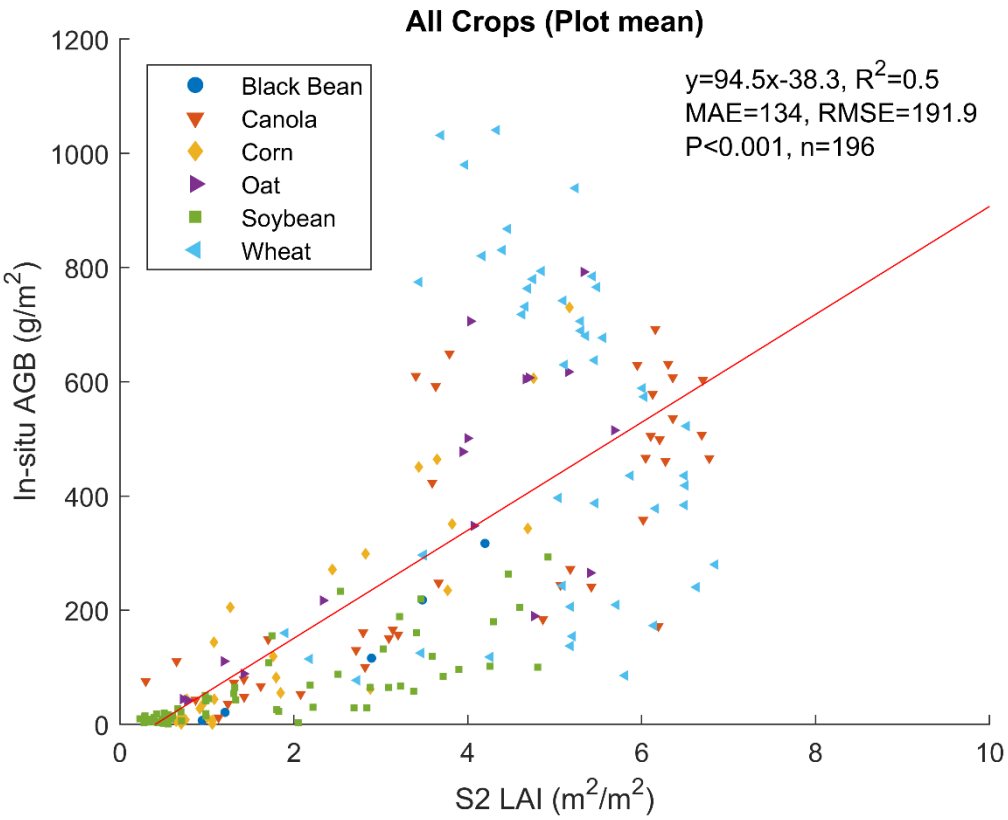


Figure S4. The correlation between crop above ground biomass (AGB) and Sentinel-2 derived LAI for all crops in the study area. The satellite-derived green LAI is sensitive to all green parts (stems and beans) in the crop canopy.

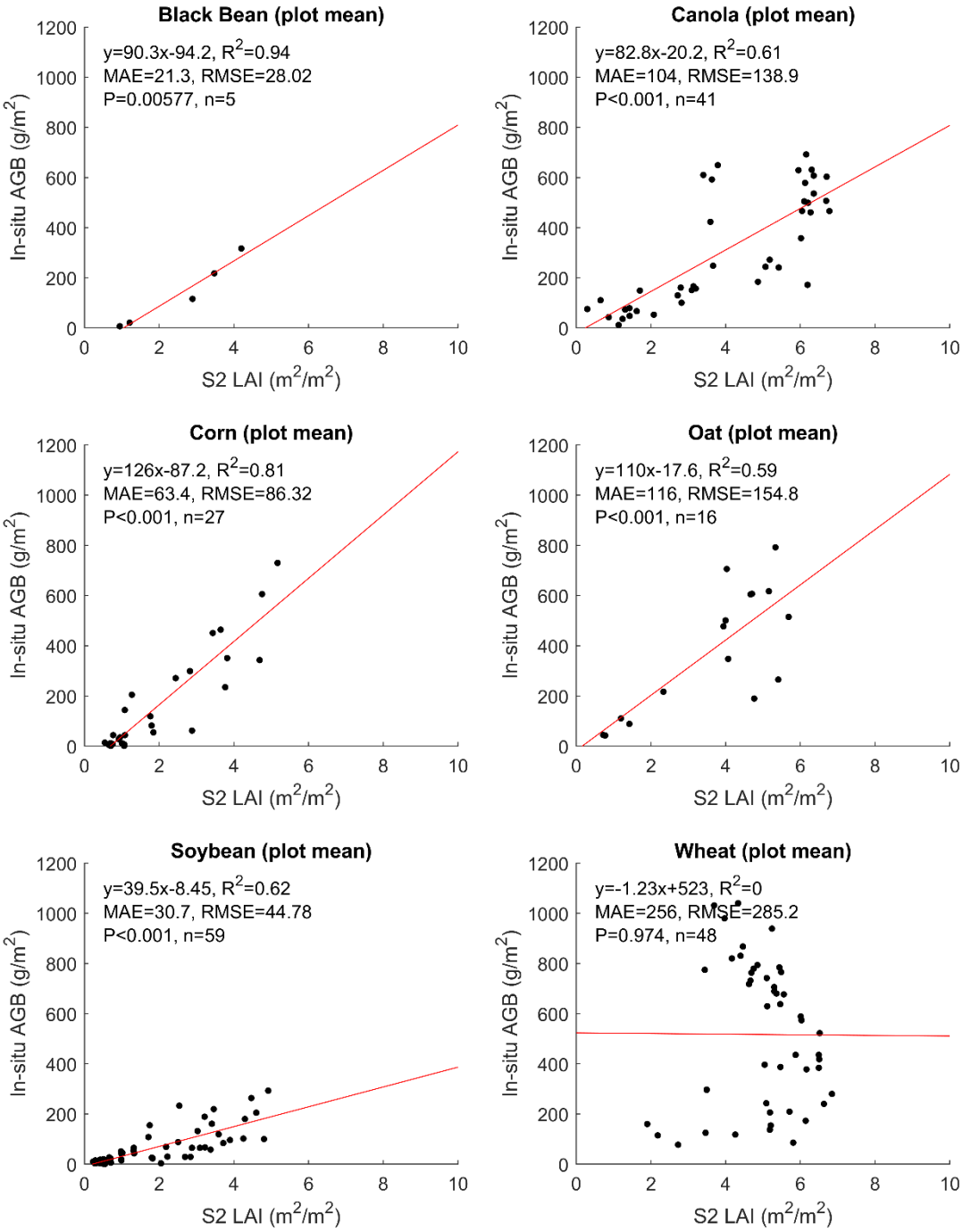


Figure S5. The correlation between crop above ground biomass (AGB) and Sentinel-2 derived LAI for each of the crop types in the study area.

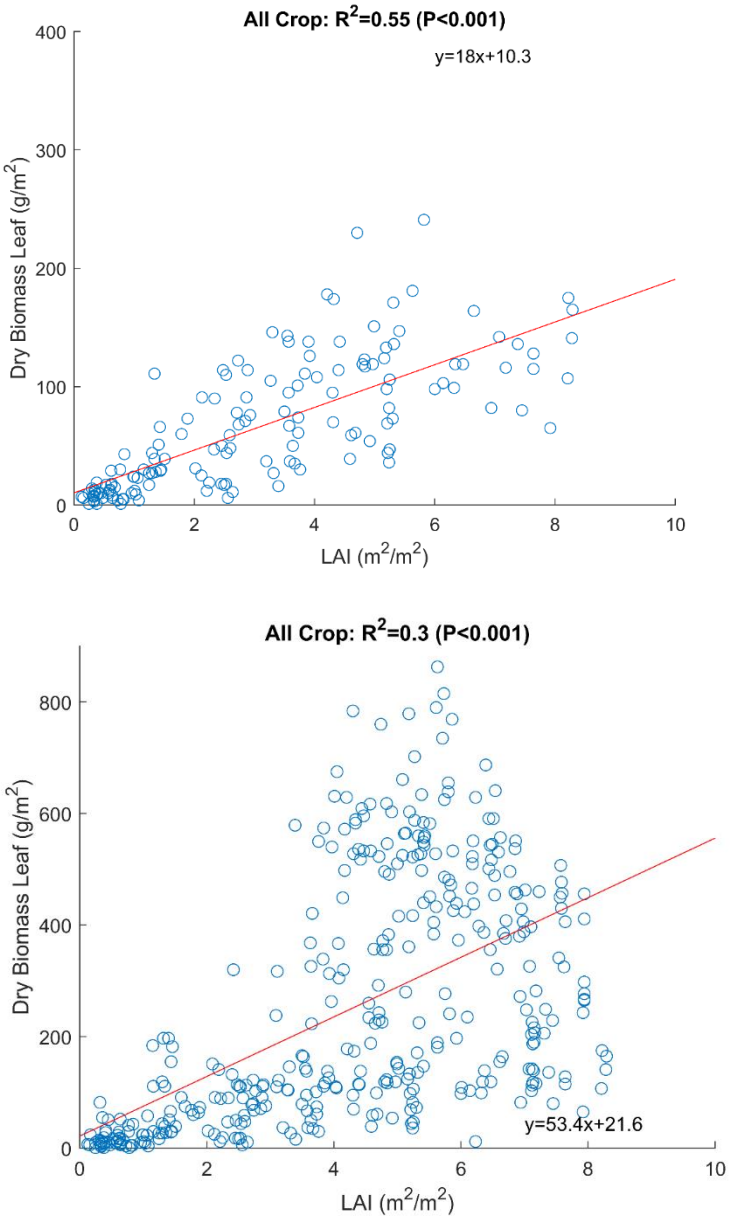


Figure S6. The correlation between crop leaf dry biomass and Sentinel-2 derived LAI for all crop types in the study area. Upper panel: excluding wheat and oat samples; Lower panel: including wheat and oat samplings. For wheat and oat, their "leaf biomass" samplings contain some stems.

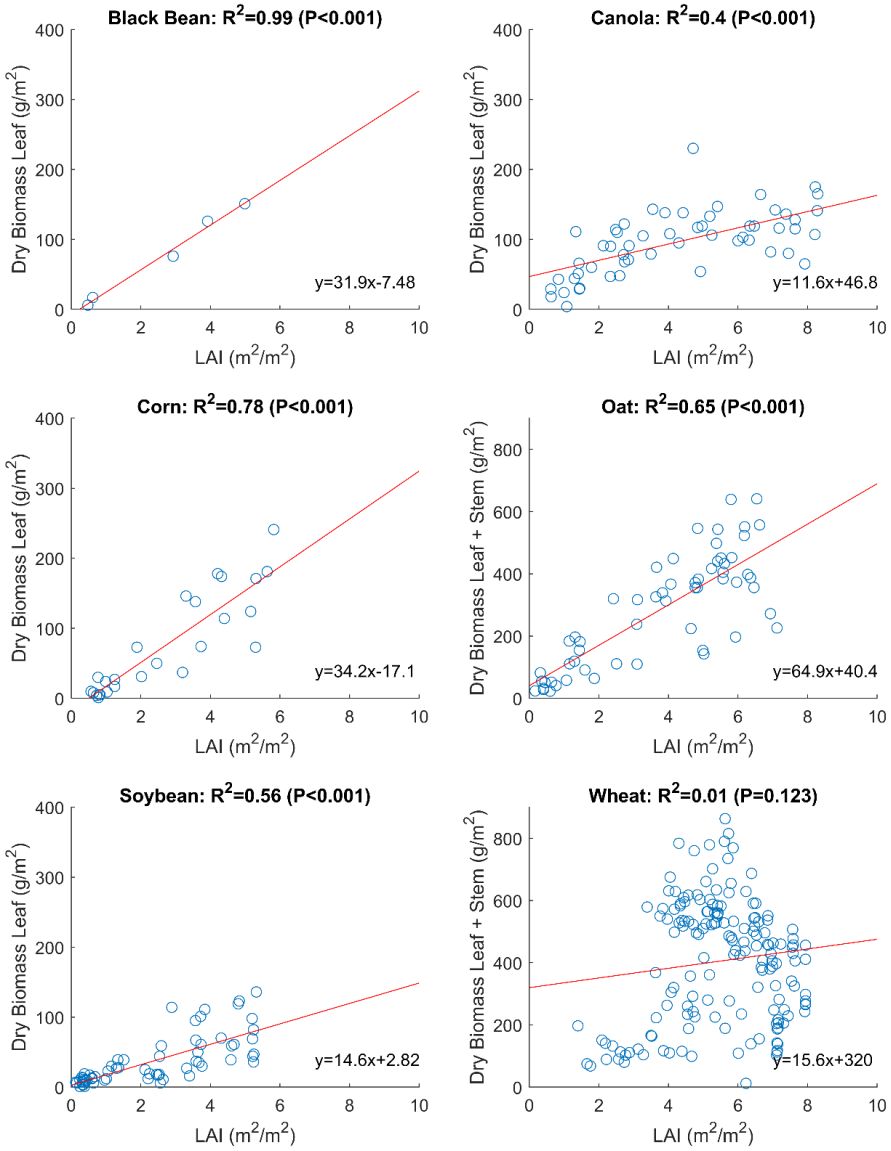


Figure S7. The correlation between crop leaf biomass and Sentinel-2 dervied green LAI for each crop types in the study area. For oat and wheat, their leaf biomass and stem biomass are not separated in the samplings; while the green LAI derived from satellite contains information from green stems and beans.

Table S1. Statistics of above-ground biomass for each crop type in the study area.

Name	code	Count	Mean ($g\ m^{-2}$)	One std ($g\ m^{-2}$)
Barley	133	44878	1224	170
Millet	135	1613	1451	203
Oats	136	216656	1343	138
Rye	137	85720	1570	187
Triticale	139	1437	1348	131
Winter Wheat	145	28353	1505	196
Spring Wheat	146	741838	1324	168
Corn	147	481522	1368	153
Canola	153	559073	1269	221
Flaxseed	154	6050	1235	198
Sunflower	157	11864	1310	151
Soybeans	158	1159317	543	89
Peas	162	14914	908	258
Beans	167	86260	827	164
Potatoes	177	38238	1657	175
Canaryseed	196	10098	1249	92
Hemp	197	434	1529	79