



**Supplementary Figure 1.**  $r_{\text{area}}$  and *yield rate* show a weak positive correlation across global regions. (a) Correlation analysis of  $r_{\text{area}}$  with *yield rate* for rice, maize, soybean, and wheat in global regions. (b) Correlation analysis of  $r_{\text{yield}}$  with *yield rate* for rice, maize, soybean, and wheat in global regions.