

# Estimation of maize yield using a process-based remote sensing mechanism model in the Northeast China Plain

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**Abstract:** Agriculture plays an important role in providing food in developing countries. Therefore, it is essential that and development organizations have maximum transparency on expected and actual crop yields, so that they can make better policy decisions. Accurate estimation of the crop yield is of great importance for food safety and grain policy making. In this study, a process-based remote sensing mechanism model was developed to yield of C4 crops through modifying the crop photosynthetic pathway in the remote-sensing–photosynthesis–yield estimation for crops (RS-P-YEC) model based on the BEPS model, and the Harvest Index (HI) derived from the ratio of grain to stalk yield was adopted in the developed model. The developed process-based model was used to simulate the maize (*Zea mays* L., C4 crop) yield in the Northeast China Plain during the period 2007-2009. The 69 statistics data at county level from study area was used to validate the simulated results. The results showed the correlation coefficient ( $R^2$ ) was 0.637 (n=69) between the simulated yield and the statistics yield, and the root mean square error (RMSE) was 1060 kg/ha, with a relative error of 11.9%. The spatial pattern of simulated yield was consistent with the actual distribution in the Northeast China Plain, with an increasing trend from the northeast to the southwest. The results implicated that the developed process-based model was suitable for yield prediction of C4 crops on a regional scale.

**Keywords:** RS-P-YEC model; Maize; C4 crop yield; Remote Sensing; Northeast China Plain.