Review of: "Yield Forecasting Model for Maize Using Satellite Multispectral Imagery Driven Vegetation Indices"

Jamshid Piri[1]

1 Zabol University

Potential competing interests: No potential competing interests to declare.

Dear Prof.,

Here is a summary of the key points from the document:

1. The study investigates using Landsat 8 and Sentinel 2A satellite data to develop a model to predict maize yields before harvest in Kaharole, Bangladesh.
2. 20 farmers' maize fields were selected over 2 growing seasons (2018-19, 2019-20). NDVI values and yield data were collected. Higher resolution Sentinel 2A (~10m) performed better than Landsat 8 (~30m).
3. Mean NDVI vs mean yield over the 2 combined seasons gave the best regression model results (highest R2, lowest MAPE/RMSE). Sentinel 2A outperformed Landsat 8.
4. The model was validated using 2020-21 data. Predicted mean yield error was 10.15% for Landsat 8 and 8.82% for Sentinel 2A, showing Sentinel 2A's superiority.
5. The study shows the potential of using high resolution Sentinel 2A NDVI data for pre-harvest yield prediction of maize in Bangladesh, outperforming Landsat 8 with ~10m vs ~30m resolution. This allows timely information for agricultural management and food security.

Some suggestions to potentially improve this paper:

1. Expand the analysis to additional locations and years to further validate and generalize the model. As of now, it is limited to one upazila over 3 years.
2. Incorporate other vegetation indices like EVI and SAVI along with NDVI into the yield models to compare performance. NDVI can saturate at high biomass.
3. Utilize more advanced time-series based regression techniques like random forest instead of simple linear regression. This may improve model accuracy.
4. Examine the effect of major factors like soil moisture, temperature, fertilizer application etc. alongside NDVI to build explanatory crop yield models identifying key predictors.
5. Conduct an economic analysis on how this predictive information translates to tangible financial gains for farmers and agriculture organizations through early planning.
6. Develop this into an operational workflow leveraging cloud computing for regional scale yield prediction maps based on new satellite data feeds.

7. Explore integration with crop growth simulation models calibrated using satellite data for improved predictions.