Overcoming basis risk in agricultural index insurance using crop modelling and satellite phenology

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Background

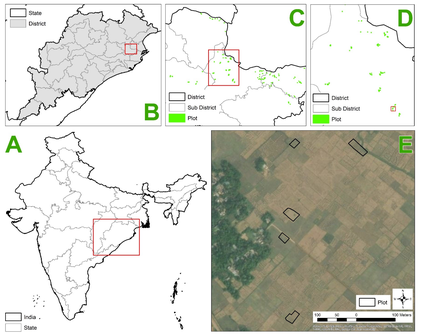
- Extreme weather is a key cause of crop failure for smallholders
- Index insurance helps to protect farmers with a financial safety net in event of crop losses
- However, many index insurance products suffer from high levels of basis risk

Research Question

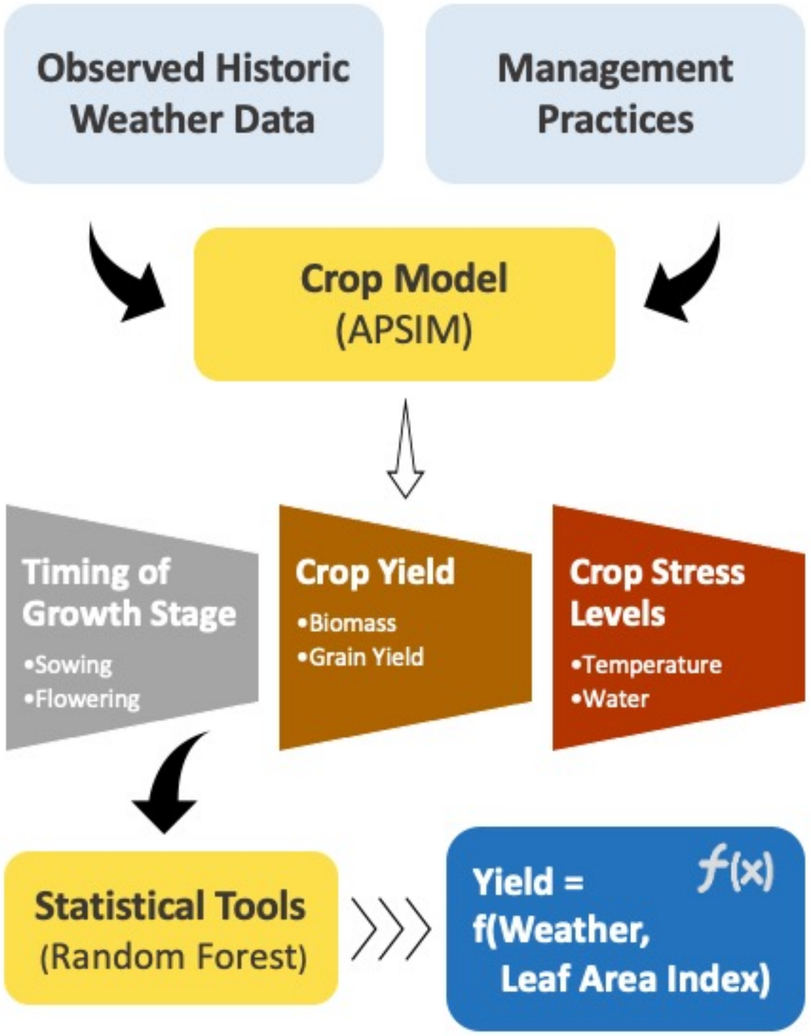
- Can crop models and satellite phenology data improve accuracy of yield estimation and reduce basis risk?

Study Area

- Rice production in Odisha state, India

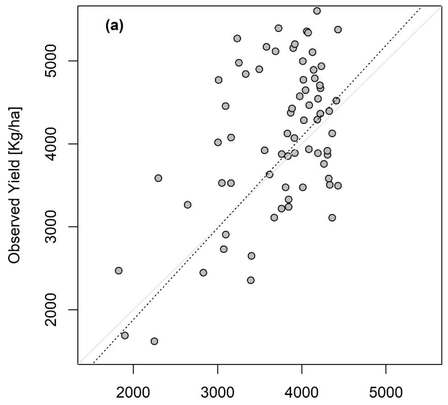


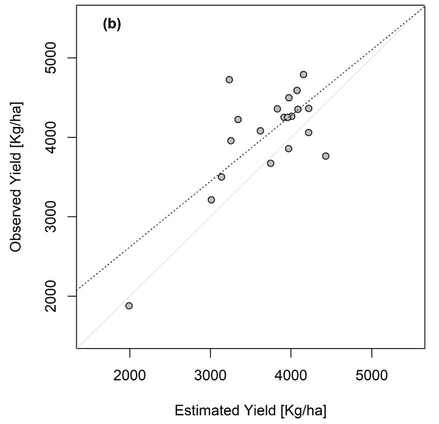
Approach



Key Findings

- Crop models linked to satellite phenology data produce reliable yield estimates at spatial scales required for index insurance (r^2 = *0.54 at village scale*)
- Combining agronomic and meteorological predictors with crop phenology reduces frequency and severity of basis risk events
- Use of crop models significantly outperforms index products based on satellite data alone and overcomes limitations imposed by small yield observation datasets





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Afshar, et al. (2021). Improving the Performance of Index Insurance Using Crop Models and Phenological Monitoring. Remote Sensing, 13, 924. https://doi.org/10.3390/rs13050924