Assessing Impacts in Agriculture at Ultra-low Costs

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with input from Meja Jain
Ratio of crop yield to economic potential yield

East Asia
Southeast Asia
North America
Western and Central Europe
Australia and New Zealand
Western Asia
South America
South Asia
Pacific Islands
North Africa
Eastern Europe and Russian Federation
Central Asia
Central America and the Caribbean
Sub-Saharan Africa

Actual crop yield as percentage of potential yield

Source: FAO, 2011b.
Survey-based measures of yield in W Kenya

Reported Production in 90kg Bags, 2013 & 2014

Reported area of maize fields in 2014
Measured plot area for fields with reported area = 0.5 Acres
Can satellites help to:
- evaluate interventions?
- target interventions?
Historically, haven’t been able to repeatedly observe individual smallholder fields.

IKONOS image (~1m), June 2013

Landsat 8 pan-sharpened image (~15m), June 2013

W Kenya field sites shown on 2 images
Four sites for Skybox 4 Good

- W Kenya
- E Uganda
- Rwanda
- NE India
Crop yield estimation in Google Earth Engine
Maize yields in Iowa, 2008-2013
Estimates from “SCYM”
Rainfed maize yields in 3 I States

Lobell et al., in press, *Remote Sensing of Environment*
Four sites for Skybox 4 Good

W Kenya

Rwanda

E Uganda

NE India
Testing Skybox in smallholder systems

Skybox Image Dates

- June 18 2014
- July 5 2014
Mean NDVI

Corr = 0.43

Only fields > 0.25 ha
Corr = 0.55

One-acre fund (OAF) fields
Non-OAF fields
Four sites for Skybox 4 Good

- W Kenya
- Rwanda
- E Uganda
- NE India
Questions:
-what are impacts of “early sowing” extension efforts?
-what facilitates faster adoption?
-what are main constraints to yields?
-what are potential benefits of “precision” interventions?
- 80 crop cuts
- ~250 farmer surveys
Early Sown Field (Nov 1 – Nov 15)

Late Sown Field (Dec 15 – Dec 31)
Four sites for Skybox 4 Good

W Kenya

Rwanda

E Uganda

NE India
• 540 crop cuts in 2015

• Joint with LSMS team (Talip Kilic, Sydney Gourlay, Siobhan Murray) and Uganda Bureau of Statistics
Summary

• Skybox + Google Earth Engine + (some robust algorithms) = powerful and low cost tool for monitoring agriculture