AGRICULTURAL FUND PROJECT
PROOF OF CONCEPT

January 2018

Agricultural Fund Project Statement

The proposed Agricultural Fund project intends to invest in Exchange listed derivatives contracts to profit from inefficiencies in the measurement of global supply and demand of agricultural crops. The project seeks to apply burgeoning technology, including satellite monitoring of global crops and machine learning techniques, to supplement traditional techniques in developing supply-demand balance sheets in order to identify investment opportunities in mispriced markets.

Test Case – Brazilian Cane Crush

- Determine if the cane harvest cane be observed through existing satellite imagery sources
- Two regions tested:
  - **Larger Region:** subset of Sao Paolo growing region of approximately 13,000 km^2
  - **Smaller Region:** region surrounding a single mill of approximately 300 km^2 (about 20 miles across)
- Imagery Sources:
  - **Sentinel-2/Landsat:** visible light (photo) images
  - **Sentinel-1:** Synthetic Aperture Radar (SAR) images
  - **Planet Labs:** calibrated 4-band visible light images (near daily basis)

Test Regions

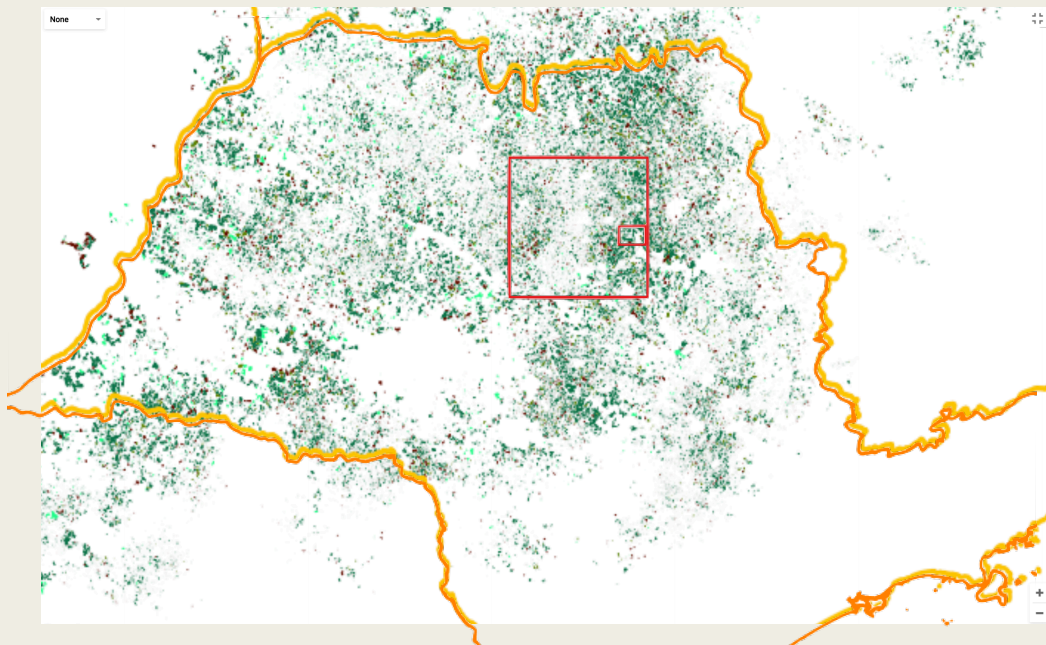Larger Region – subset of Sao Paolo growing region of approximately 13,000 km^2

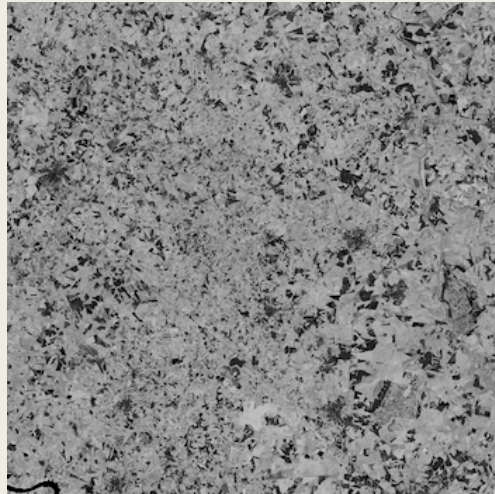Smaller Region – region surrounding a single mill of approximately 300 km^2 (about 20 miles across)
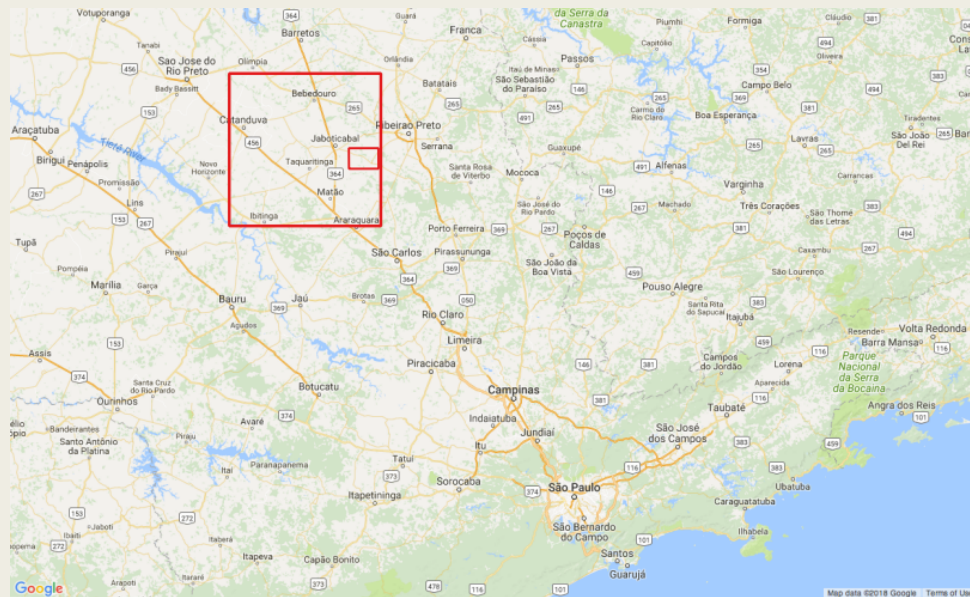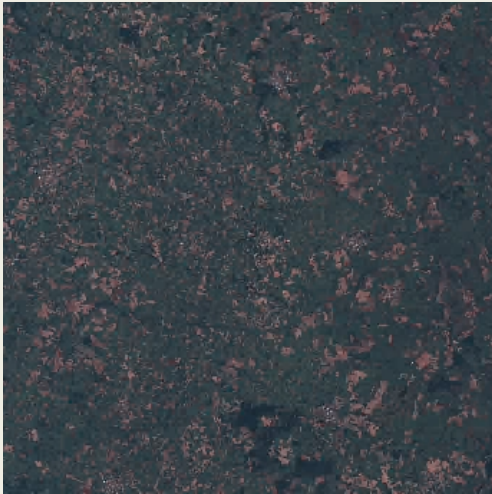
Larger Region

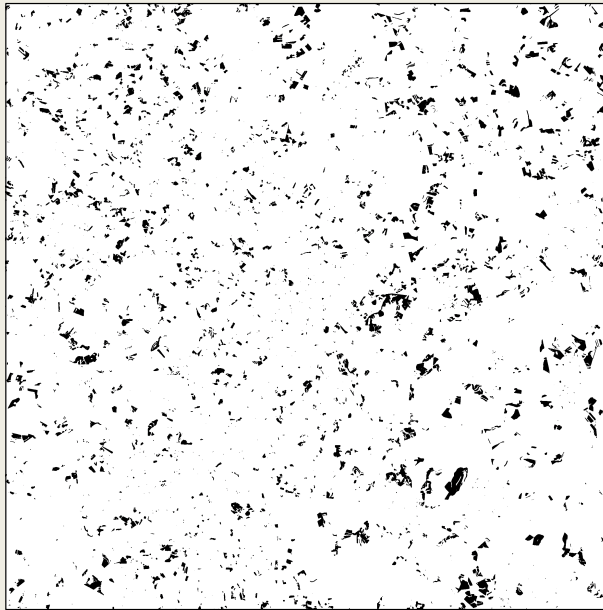Covers one section of the Sao Paulo cane growing region (~13,000 km²)

Larger Region

Technique: Calculate NDVI for region (~13,000 km^2)

Darker regions in NDVI correspond to harvested/bare regions

Larger Region

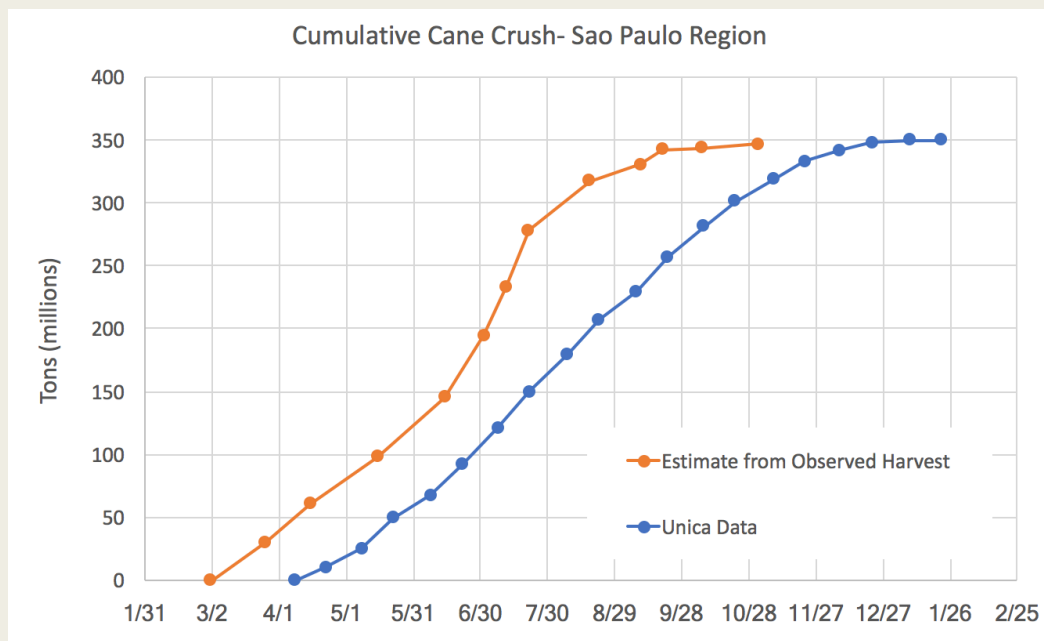Technique: Measure harvested hectares by differencing successive dates

* Dark regions correspond to fields harvested between June 4th and June 24th
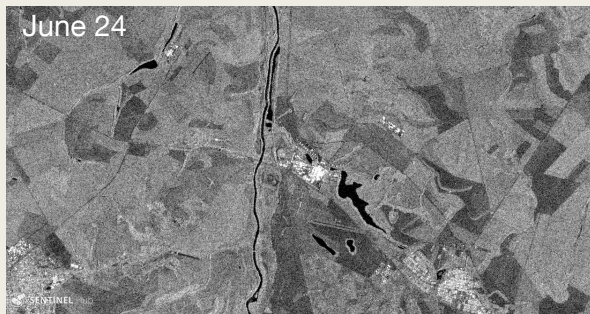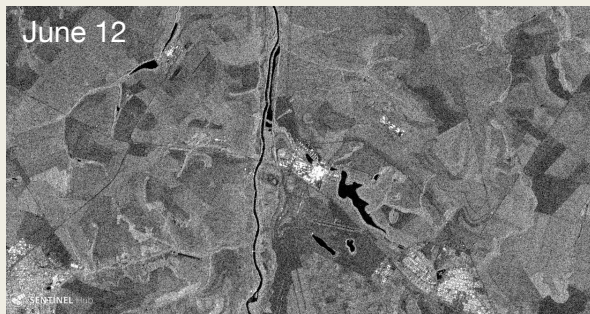
Larger Region

Technique: Measure cumulative harvested hectares and scale to tons of cane harvested

Extrapolation from observed data leads UNICA Reported Crush

Cumulative Cane Crush- Sao Paulo Region

Image Comparisons Using SAR

June 12

June 24

Difference Image (harvested fields)

Differently Comparison Across Disparate Sources

Planet imagery is calibrated 4-band; differencing technique works between imagery sources

Sentinel – March 16

Planet – March 30

Difference Image (harvested fields)