South American Soy Engagement Prioritization

Methodology

August 30, 2019

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Methodology Overview:

- This engagement prioritization process / risk assessment methodology is applied to section 3 of our Soy Action Plan for the Cargill Policy on Sustainable Soy – South American Origins.
- The approach incorporates both a historical lens of past land conversion that has soy cultivation today and a future lens of examining existing land status on land that is suitable for future soy cultivation.
- This methodology is applied to the Amazon, Cerrado and Gran Chaco biomes of Brazil, Argentina, Paraguay, Uruguay and Bolivia.
- This approach is applied at 30m pixel level of granularity across the regions under review.
- This process along with the locations of our suppliers feed into our overall assessment.

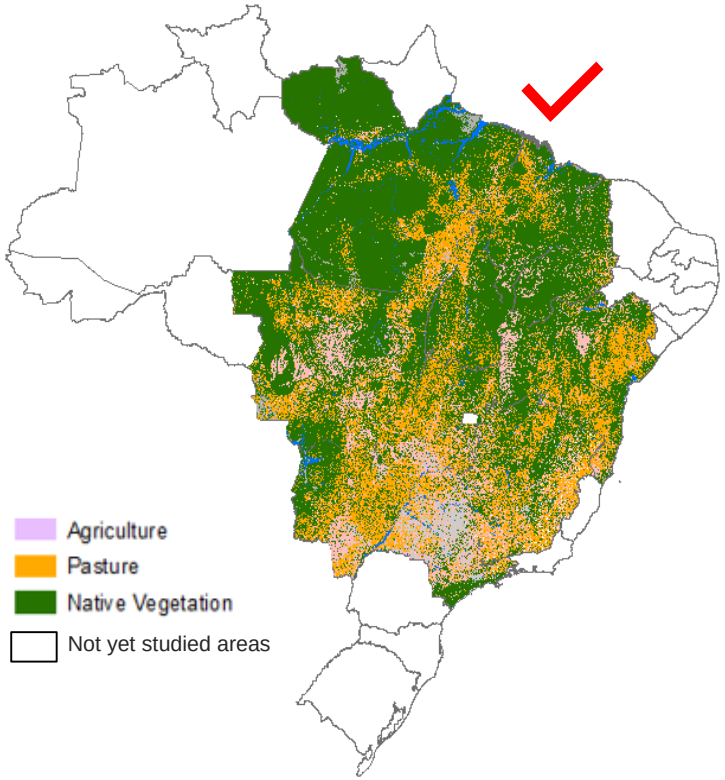
Future Lens Methodology:

- Identification of the priority biomes of the Amazon, Cerrado and Gran Chaco.
- Identification and segmentation of current land use; cultivated agriculture, pasture and native vegetation including forests.
- Identification of areas suitable for soy cultivation determined by rainfall levels, soil characteristics, terrain, and removal of protected areas.
- What remains on the image is the current land use status on areas suitable for current and future soy cultivation. Areas shown as white are either not suitable or not in the biomes under review.
- Prioritization is determined by identifying those suitable areas with higher concentration of native vegetation (shown in green in the last image).

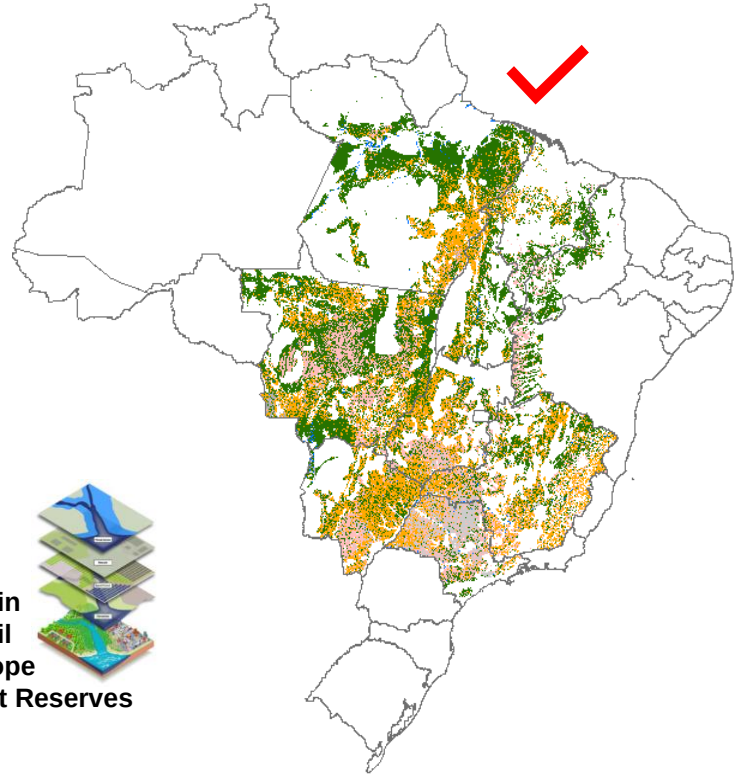
Future Lens Methodology:

Priority Biomes

Land Cover



Soybeans crop suitability



Rain
Soil
Slope
Not Reserves

Data source:

MAPBIOMAS

RESOLVE

UNIVERSITY OF MARYLAND
DEPARTMENT OF GEOGRAPHICAL SCIENCES

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Ministério do Meio Ambiente

GLOBAL FOREST WATCH

Historical Lens Methodology:

- Identification of the priority biomes of the Amazon, Cerrado and Gran Chaco.
- Identification of land area that is in a soy crop rotation cultivation in the recent growing seasons.
- Identification of forest loss since 2008 which is when the current Forest Code was adopted in Brazil.
- The output is a map of current soy crop rotation cultivation overlapped with historical deforestation.
- By examining the change of the final output from one season to the next, trends and patterns of soy growth at the expense of native vegetation is determined.

Historical Lens Methodology:

Soy area

Forest Loss since 2008

Soy area x Forest Loss since 2008

Data source:

MAPBIOMAS

RESOLVE

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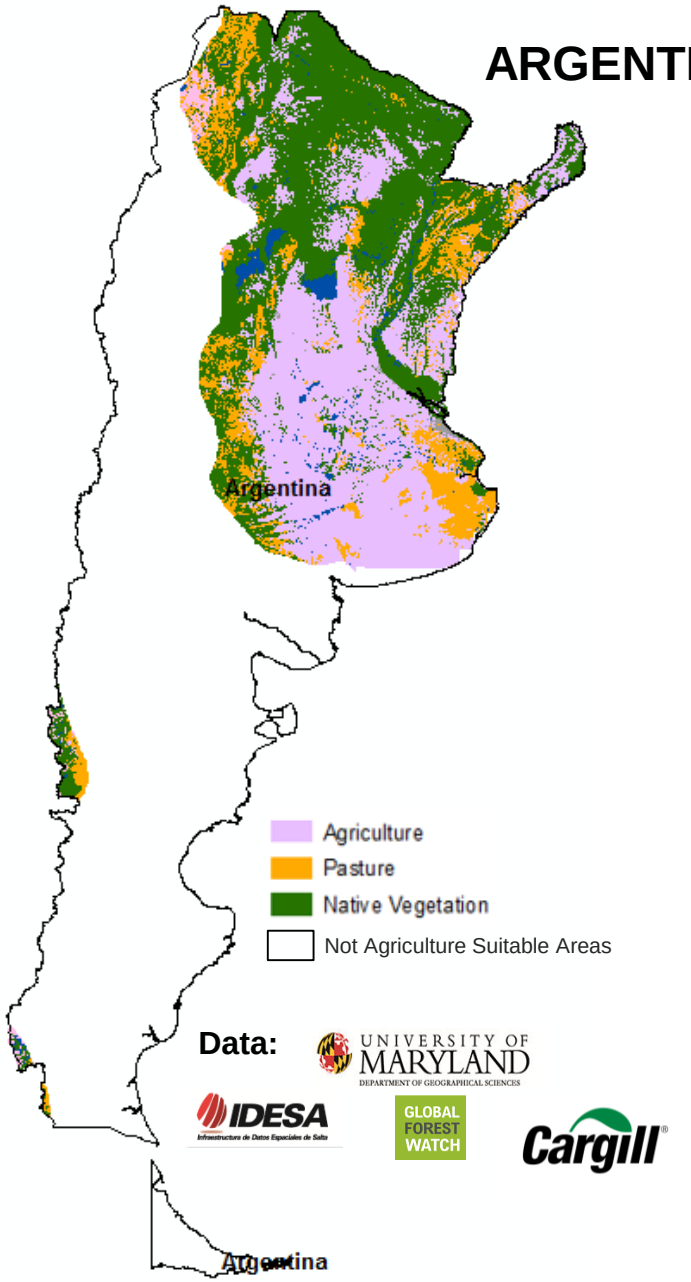
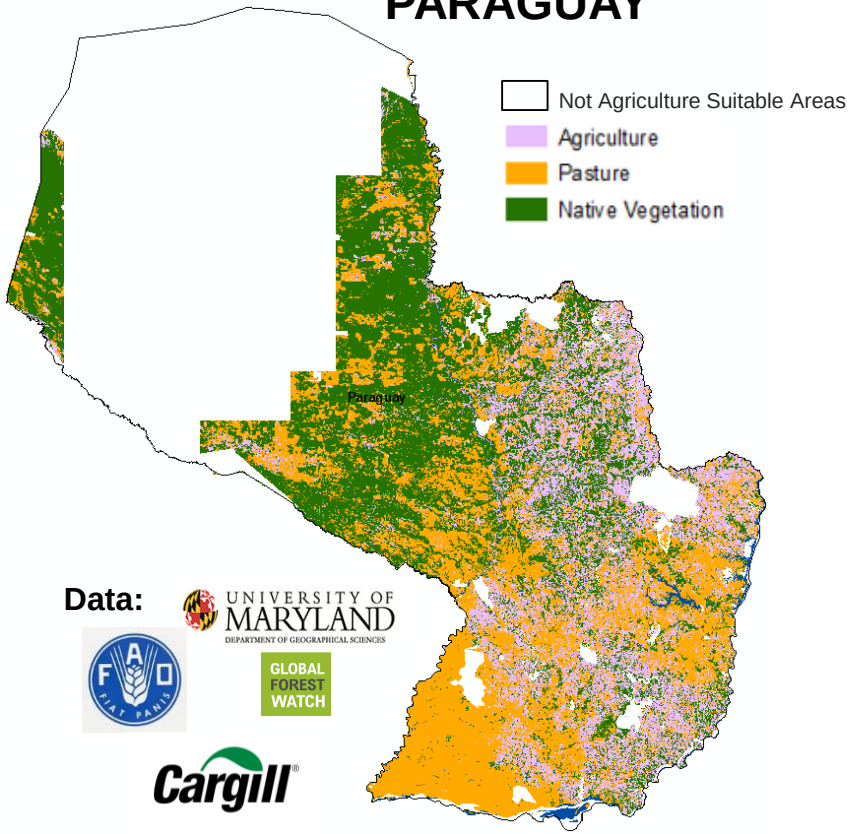
GLOBAL FOREST WATCH

Output Overview for Argentina, Paraguay and Bolivia:

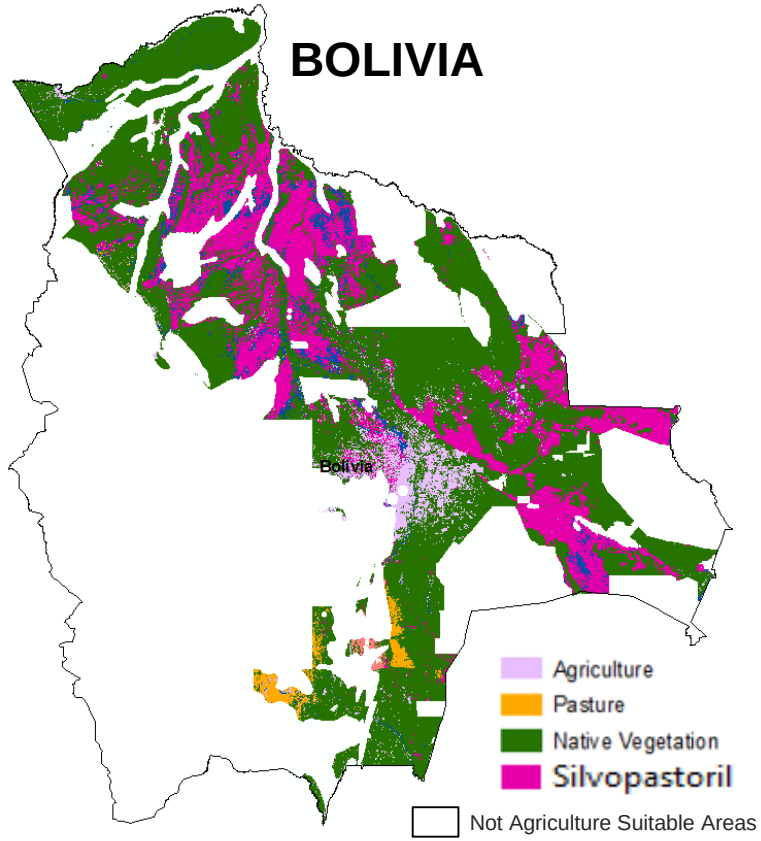
ARGENTINA



PARAGUAY

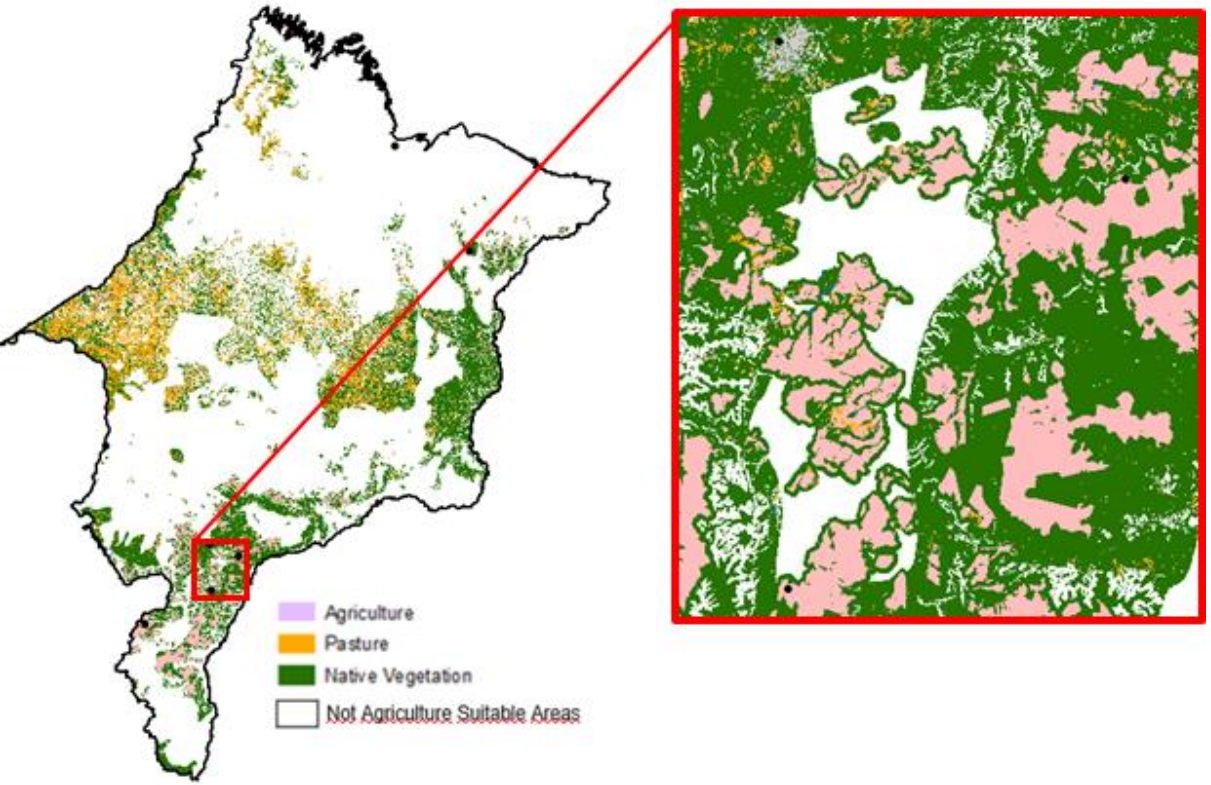


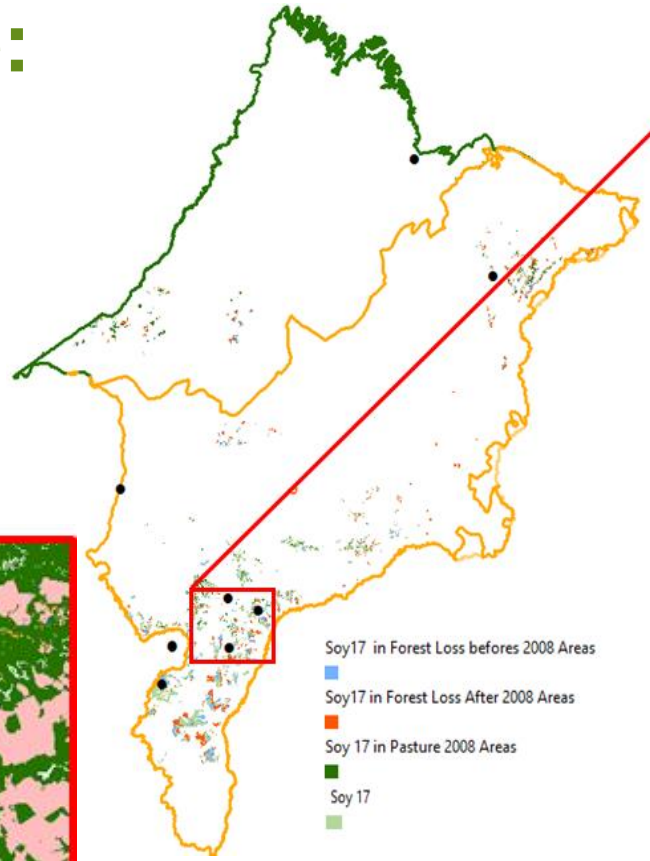
BOLIVIA

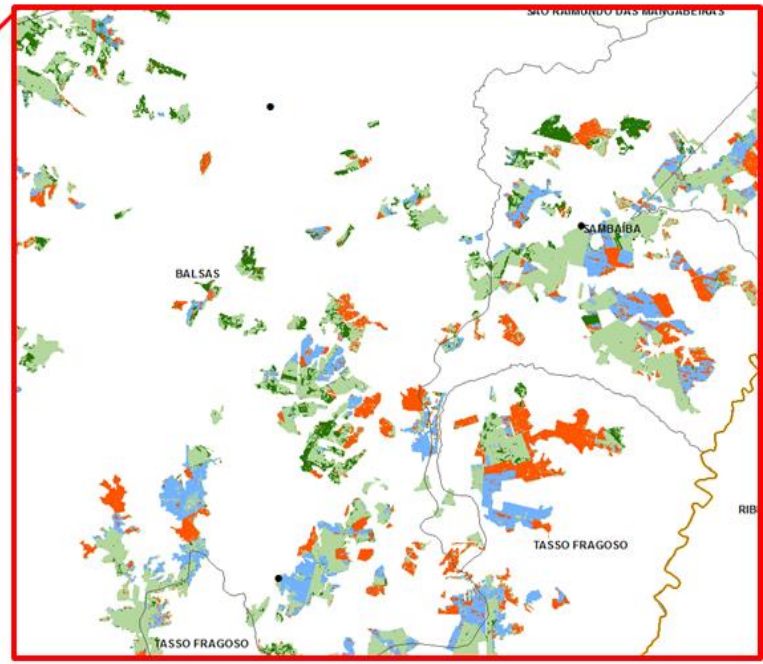


* “Silvopastoril” is the practice of combining forestry with grazing of domesticated animals in a mutually beneficial way

Localized View Example:







Data Sources:

- **Forest Loss –** Data from the University of Maryland developed by Matt Hansen, also available on Global Forest Watch (WRI) platform; 2017; Chosen because of it Worldwild cover facilitating the standart methodology for all geographies; https://www.globalforestwatch.org/; http://earthenginepartners.appspot.com/science-2013-global-forest
- **Land Cover BR –** Data from Mapbioma group; 2017; Chosen because of it cover and resolution briging a stardadized data for all Brazil; http://mapbiomas.org/map#coverage
- **Land Cover AR** – Data from IDESA – Instituto para el Desarolo Social Argentino, agency that provide statistical information about Argentina; 2007; Chosen once it is the more reliable source of data from Argentina; http://geoportal.idesa.gob.ar/layers/geonode%3Alccs_n3_2007
- **Land Cover PY** – Data from a FAO study of Land Cover in Paraguay; 2005; Chosen once it has a detailed analysis about Land Cover of Paraguay; http://193.43.36.146/map?entryId=4e81b87a-27e4-4327-8204-736e626cf5d6
- **Land Cover BOL** – Data from a FAO Study of Land Cover of Bolivia, available through GeoBolivia, website of geographic data about Bolivia; 2001; Chosen once it has detailed analysis about Land Cover of Bolivia; http://geo.gob.bo/portal/
- **Biomes** – Data from Ecoregions ® RESOLVE website of RESEOLVE NGO; 2017; Chosen once it has a Worldwide data making possible to standardize the analysis for all geographies; https://ecoregions2017.appspot.com/
- **Soy regions and Agriculture Suitability** – Cargill data property; 2019