Joint industry mechanism for protection of native vegetation in soy supply chain

Immediate action is needed to ensure that soybean production does not continue to drive deforestation and the conversion of at-risk natural ecosystems in South America. This proposal outlines a design for a joint industry mechanism for soy traders to eliminate purchases of soy and other crops originating from recently cleared lands based on common criteria and organized around a collective system for monitoring, reporting and verification. The system relies heavily on a land-use change monitoring system provided by Agrosatélite that can evaluate land conversion across vast areas at a relatively low cost that can be shared across multiple actors.

Spatial monitoring and verification system proposal

Step 1: Determine the common standards and criteria, including regions for monitoring and the cut-off date for conversion

It is important to establish common standards and criteria, such as a cut-off date for conversion that allows for all farmers to be in compliance the date the system begins, definitions of which vegetation to monitor, and regions for monitoring, to ensure successful implementation and actual impact on the clearance rate.

Actors participating in the joint industry mechanism will decide upon an agreed-upon cut-off date for conversion (example: May 15 of 2017). This means that at the time of the cut-off date and mechanism's implementation, all farms will be in compliance. Only clearance after the cut-off date will render a farm out of compliance. Traders will agree not to purchase from properties with future clearance.

All municipalities with any soy production in the Brazilian Cerrado, in the Gran Chaco and the Atlantic Forest regions in Paraguay, the Gran Chaco region in Argentina, and soy-producing regions in Bolivia, will be monitored.

The widely recommended framework of protecting "native vegetation" (also referred to as "natural vegetation") is the recommended standard for farms' and producer groups' crop and cattle production, as recommended by the Sustainable Agriculture Network[1] and supporting organizations as well as the Roundtable on Responsible Soy, and should be utilized across South America. Native vegetation as the recommended baseline for conservation is the position of Brazilian civil society organizations who have called for the expansion of the Soy Moratorium to cover the Cerrado[2], WWF--whose guidance recommends that "by 2020 at the very latest" companies should "make sure their soy supply chains are 100% free from deforestation and conversion of natural habitats"[3], the Union of Concerned Scientists[4] and Mighty Earth. The RTRS Standard for Responsible Soy Production Version 3.0 requires no conversion of "all land with natural, native vegetation, including, but not limited to, native forests, riparian vegetation, natural wetlands, grasslands, savannahs, prairies, cerrado and woodlands" as of

[1] SAN Standard 2017. https://dl.dropboxusercontent.com/u/585326/2017SAN/Certification%20Documents/SAN-Standard-2017.pdf, *see page 37*
[2] Agenda de Ação Para o Combate ao Desmatamento. 2016. http://www.greenpeace.org/brasil/Global/brasil/image/2016/Maio/Carta_MMA_atualizada.pdf
[3] WWF Soy Scorecard, 2016. http://soyscorecard.panda.org/recommendations-companies
[4] Union of Concerned Scientists. October 2016. The Importance of Brazil's Cerrado. www.ucsusa.org/Cerrado

June 2016[5]. Finally, many scientists and ecologists in the region have published analyses showing that in order to avoid losing biodiversity and ecosystem services, conservation and sustainable land use policies need to be extended to non-forest ecosystems, including savannahs and grasslands.[6][7]

Furthermore, remote sensing experts widely agree that while it is relatively easy to distinguish between native vegetation and cleared land in ecosystems such as the Cerrado that are a mix of grasslands, savannah, shrublands, woodlands, and/or forests, it is challenging to distinguish between these various forms of vegetation. This is true whether using automated procedures or expert human interpretation. In addition, future monitoring systems in regions of interest are expected to aggregate native vegetation types. For example, the forthcoming Brazilian PRODES Cerrado system is expected to map clearing of any natural vegetation, aggregating forests with other native vegetation types. There will be no distinctions between forested native vegetation and non-forest ecosystems in the PRODES Cerrado monitoring. These are technical reasons that recommend the monitoring of all native vegetation, not just forests, for conversion.

Native vegetation is defined using the SAN standard as "the vegetation that is, was, or would be present without intensive human disturbance" within natural ecosystems, which are "ecosystems that resemble – in terms of species composition, structure, and function – those that are or would be found in a given area in the absence of significant human management impacts."[8] This includes forests and other native terrestrial ecosystems, including woodlands, shrublands, savannahs, grasslands, peatlands and páramo:

Indicators of the presence of native vegetation are areas that:

> Consist primarily of native plant species; and,
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> Contain a vegetation structure that generally resembles a native ecosystem of the same age in the same area; **or**
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> Are classified as High Carbon Stock (HCS) forests according to the HCS approach (www.highcarbonstock.org) or, in regions where HCS parameters have not yet been defined, have been regenerating for at least 10 years with minimal human disturbance.

The decision procedure that will be used by Agrosatélite to identify native vegetation is a conservative one and is based on satellite images acquired over different seasonal periods including a time series of images (MODIS) that can look into the past to ensure the absence of signs of human intervention on the native vegetation. Native vegetation will be defined by evaluating MODIS images to ensure the absence

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[5] RTRS Standard Responsible Soy production Version 3.0. June 2016. http://www.responsiblesoy.org/wpdm-package/english-rtrs-standard-responsible-soy-production-version-3-0/?lang=en, *see pages 24, 38-39, 41*

[6] Overbeck et al. 2016. Conservation in Brazil needs to include non-forest ecosystems. http://onlinelibrary.wiley.com/doi/10.1111/ddi.12380/full.

[7] Strassburg et al. 2017. Moment of truth for the Cerrado hotspot. https://www.nature.com/articles/s41559-017-0099

[8] SAN Standard 2017. https://dl.dropboxusercontent.com/u/585326/2017SAN/Certification%20Documents/SAN-Standard-2017.pdf, *see page 23*

of evidence of significant human management impacts for the past ten years. Areas without evidence of significant human management impacts will be considered native vegetation at the cut-off date.

Activities that will qualify as human disturbance and significant human management impacts include:

- Conversion to agricultural fields, pastures, tree plantations, or any other land use;
- Intentional burning;
- Development of buildings or infrastructure, except for small-scale construction for sustainably managed eco-tourism, education, or research purpose;
- Construction of new permanent dams and draining or drying of aquatic ecosystems.

Step 2: The development of baseline maps and annual monitoring of soy development

Agrosatélite will develop current baseline maps of native vegetation and crop production for the Brazilian Cerrado biome, the Gran Chaco and Atlantic Forest regions in Paraguay, the Gran Chaco region in Argentina, and soy-producing regions in Bolivia. The baseline map will be developed based on the cut-off date to serve as a reference map for future clearance.

Accurate current reference baseline maps of the native vegetation remnants are essential so that farmers and traders clearly know where soy should not be planted after the cut-off date. Having a baseline map of native vegetation overlaid with property boundaries also allows traders to inform the farmers in advance of the areas off limits to expansion. The existing baseline maps of the Brazilian Cerrado are already outdated for a cut-off date in 2017. The existing baseline maps include the 2013 *Mapeamento do Uso e Cobertura Vegetal do Cerrado - TerraClass Cerrado*[9] and a 2014 basemap developed by Agrosatélite as part of the *Geospatial Analyses Of The Annual Crops Dynamic In The Brazilian Cerrado Biome* project.

Agrosatélite will map any native vegetation clearance at least once annually to identify areas of clearance. This system would rapidly identify areas of new clearance, and traders can communicate to farmers in that region in their supply chain immediately, before any further investments in clearing and planting are made (see next section for identification of farms in and out of compliance.)

Following the criteria established by the GTS, monitoring in Brazil will be restricted to clearing on private rural properties and to clearing of properties partially located within Conservation Units (CU), Indigenous Lands (IL) and Settlements (Set). If INPE releases a Cerrado monitoring system as planned[10] (like the PRODES system for the Amazon), that could replace Agrosatélite's maps of annual clearing.

In addition, Agrosatélite would map new crop expansion once annually. This mapping is not done by automatic classification, but rather by analysts who evaluate Landsat and Landsat-like images, such as

[9] TerraClass Cerrado, created under the coordination of the Ministry of the Environment (MMA) by technicians from the Brazilian Institute of Environment (IBAMA), the National Institute of Space Research (INPE), the Brazilian Agricultural Research Corporation (EMBRAPA), the Federal University of Goiás (UFG) and the Federal University Of Uberlândia (UFU). http://www.dpi.inpe.br/tccerrado

[10] MundoGeo. 2017. Ministério da Ciência vai monitorar desmatamento e queimadas no Cerrado. http://mundogeo.com/blog/2017/04/17/mctic-vai-monitorar-desmatamento-queimadas-e-emissoes-de-gases-no-cerrado

from Resourcesat and Sentinel satellites, at the end of soy crop seasons. Once the system is in place, Agrosatélite could determine which properties have planted crops at the expense of native vegetation within two months of the close of the growing cycle, which may vary regionally. For example, the soy growing cycle ends in the Brazilian Cerrado in February/March, so Agrosatélite will be able to determine which properties planted soy on cleared land by April/May. (Note: there will be almost no conversion to soy in the first year after clearance as the conversion process takes normally more than one year.) Note that other crops could be mapped in a similar fashion at the end of those crop production cycles.

Step 3: Identification of compliance

Once areas of clearance have been mapped, the next step is to identify which producers are in or out of compliance.

Monitoring compliance in Brazil

The rural property registration (CAR) system in Brazil enables the identification of properties with post cutoff-date clearance; so traders should require CAR registration for all of their suppliers in Brazil. Either Agrosatélite, or another institution (such as a member of the GTS for the Brazilian Cerrado regions), will overlay clearance on farm-level property boundary information to identify which farmers recently deforested lands, generating a list with the CAR number and the associated area out of compliance. In addition, in Brazil clearance should be cross-checked against the IBAMA embargoes maps, ICMbio (Conservation Units, Conservation Priority Areas and Quilombolas), INCRA (Settlements) and FUNAI (Indian lands) to confirm compliance with existing regulations. This information will be compiled into a no-buy list of CAR numbers in the case of properties with CAR and a map in the case of areas outside of CAR, and shared with participating traders and relevant coordinating institutions, such as the GTS; this aligns with the system currently used in the Amazon. An alternative option, if all suppliers are registered in the CAR, is for Agrosatélite to generate an approved list of producers with no clearance on their lands, so a positive 'whitelist'. It will be the responsibility of the GTS and traders to then verify compliance with purchasing aligned with this list and map.

This system may also be used outside of Brazil in regions where digitized property boundary data is available; for example, it may be possible to secure property information in Paraguay from the Cadastre and Registry Information System. Obtaining property boundaries is the clearest way to determine whether or not a farm has recent clearance, allowing experts to overlay maps of vegetation clearance over property boundary data. As such, it is preferable to the systems described below. However, collection and digitization of boundary data, and addressing overlaps and contested areas, is time-consuming and can be costly, whereas the systems described below for monitoring clearance without boundary data can be implemented rapidly.

Monitoring compliance outside of Brazil

Where there is no CAR system or equivalent available digitized property boundaries, select partners, such as technical experts or NGOs proficient in GIS, could assist in the creation of a no-buy list for Argentina, Paraguay and Bolivia. In the absence of full property boundary information, property areas can be assessed in one of four ways:

1) Using a single GPS point for each property taken directly at the property;
2) Obtaining a GPS point remotely from the property address;
3) For cases where the property address is not available (or the address is an office in a town, rather than a farm), if there is any new clearance in the municipality of that address, each farm

will need to provide a GPS point or boundary data in order to be able to prove it is in compliance; or

4) Digitizing property boundaries, either by using land tenure documentation or by physically delineating the boundary with a GPS device. Agrosatélite has a mapping application that could be used to document geographical information (free of cost).

The methodology for implementing each option is explained below. In options 1 and 2, traders will need to work with farmers to acquire at least one point of geographical reference for each supplier's property. Once the point for each property has been secured, the next step is to identify a radius that would encompass the property. This radius could be based on average or median farm size. Alternately, it could be based on estimated farm size derived from the average amount of soy purchased from farms in that municipality. Because estimated yields of soy per hectare are available, one can calculate the estimated size of a farm based on purchased soy weight, and develop an algorithm for an estimated radius. *This system has been employed successfully for many years in the Amazon Cattle Agreement.* Where there is no clearance falling within the estimated radius of a farm, it can be deemed compliant. If any clearance falls within the estimated radius of any farms (based on their address or the collection of GPS points), the onus would fall on the farmer to prove that the clearance did not occur on their property. The farmer would then provide boundary data to prove the deforestation was not on their property. This system could be implemented rapidly and cost-effectively, as it can occur prior to the establishment of a property boundary database.

Option 3 could be used as a temporary measure for rapid implementation before point location data is collected, or in areas where addresses may not be available (because of a centralized buying system). Any purchases from a municipality with new clearance would not be able to be purchased from unless they provide a point location, in which case the procedure for options 1) and 2) above would be employed.

For option 4, boundary data could be digitized from paper land tenure documents, where available, by Agrosatélite or a GIS consultant. Where there is no documentation of land boundaries, property data can be obtained by manually walking the property boundaries with a GPS device.

Criteria can be developed to determine how to bring farms back into compliance, and move them off a no-buy list, if they have cleared lands. This might include restoration activities to reintroduce native vegetation.

Step 4: Independent audits

Companies will secure independent audits, like they do for the Soy Moratorium in Brazil, to verify compliance in purchasing. Independent audits should be conducted each year by a list of agreed approved auditors (could be decided by the GTS for Brazil, and will need to be decided by a multi-stakeholder group for other countries outside of Brazil). Agrosatélite will provide the auditors with a list of all CAR properties (with associated GPS locations) out of compliance in Brazil, and GPS locations of all areas out of compliance for Argentina, Bolivia and Paraguay. The auditors should obtain the full list of suppliers and boundary or point location data (with associated estimated radius) of each trader's suppliers and cross-reference this with the "no-buy" list from Agrosatélite to determine whether any trader purchased from any farm out of compliance.

System costs

The approximate costs for the monitoring portion of the system and generation of compliance data are between $750,000 and $1,000,000 for the first year, covering all critical soy production regions in South America, including the entire Brazilian Cerrado, the Chaco and Atlantic Forest in Paraguay, the Gran Chaco region in Argentina, and key soy-producing regions in Bolivia. Once the system is developed, including the native vegetation baseline maps, the cost will go down, possibly to half of that amount. The system could be in place by the close of 2017. Audits and costs related to compliance with the no-buy lists are additional to these costs.

The role of international finance and incentives

The system will provide information on deforestation risk in different geographies. This information can form the basis of targeted programs to address sustainability and shift to deforestation-free production at the farm and municipality level. There are many opportunities to partner with donor agencies to create programs that support deforestation-free production. The UNDP Green Commodities Programme, the Global Environment Facility (GEF), The Sustainable Trade Initiative (IDH), the World Bank Group's BioCarbon Fund, and International Financial Corporation (IFC) alongside bilateral programs are amongst a few leading organizations that have funding specifically for developing action to promote sustainably produced commodities. In recent years, there has been growing interest from international agencies to support a shift in supply chains.

There are 25.4 million hectares of already converted lands suitable for agriculture in the Brazilian Cerrado[11] and more than 200 million hectares of degraded lands across Latin America[12], coupled with great potential to improve land management and yield. This proposed joint industry zero conversion mechanism could be supported by an incentive package to famers who agree to comply with no clearance. This support could be provided by partnering with the IFC or the IDH through their newly launched fund. The IDH fund aims to trigger $1.6 billion (USD) private capital investments with a $400 million de-risking capacity. The fund will be launched in mid-2017 with an initial committed capital of $100 million from the Norwegian Government's International Climate and Forest Initiative (NICFI), based on a 2020 capitalization target for the Fund of $400 million, to be drawn from bilateral and multilateral public donors as well as private sector partners. By 2020, more than 20 production and forest protection projects should be funded globally, while leveraging private capital investments more than four times the Fund's own investment. Both IDH and IFC have informally expressed interest in discussing potential financial incentives linked to a joint action mechanism for reducing deforestation in South America.

[11] Filho, 2016. The expansion of soybean production in the Cerrado Agroicone Report. http://www.inputbrasil.org/wp-content/uploads/2016/11/The-expansion-of-soybean-production-in-the-Cerrado_Agroicone_INPUT.pdf

[12] Vergara and Messinger, 2014. Reducing Latin America's Carbon Footprint Means Restoring Life to Degraded Lands. http://www.wri.org/blog/2014/12/reducing-latin-america%E2%80%99s-carbon-footprint-means-restoring-life-degraded-lands