

Beyond piecemeal traceability: Evaluating the global impact and performance of commodity supply-chain actors

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1. Introduction

The aim of the workshop was to improve and align approaches for linking supply-chain actors to the environmental and social impacts of commodity production. The end goal of the exercise is to identify ways to achieve greater transparency on a global scale and advance the transition towards more sustainable economies.

The discussion addressed four main topics, using the issue of deforestation as a practical case of interest to all the participating organisations:

1. Linking impacts and risks of production with supply-chain actors
2. Sharing risks across different stages of a supply chain
3. Analyzing actor performance
4. Monitoring policy effectiveness, including the issue of leakage

2. Cross-cutting themes for assessing risk and supply-chain actor performance

- There is a risk of letting data availability and choices define research agendas. A question to further explore is: how can we avoid such lock-in dynamics?
- The issue of legality merits attention as a priority focus and outcome, and is distinct from broader measures of sustainability.
- The zero deforestation agenda can be restrictive, especially when there is controversy surrounding the issues of legal/illegal and zero/zero net deforestation.
- Discussion concerning the issues of responsibility and blame is a second-order concern and complicates efforts to develop robust ways of assessing first order association with sustainability impacts.
- There is a need to consider new ways to interpret risk scores as measures of opportunity, including perhaps credit scores. This is especially the case given the risk that assessment and monitoring systems may serve to create a twin-track system where the 'good guys' move out of 'bad areas' and leave a vacuum of good governance in places where such investment is most needed.
- There are distinct types of risk including reputational, legal and operational risks. Each different type may be best served by different indicators and assessment approaches.
- Measures of risk and performance need legitimacy amongst user groups if they are to be effective. Different users often require different approaches. The same user may also require a number of different approaches depending on the stage they are at in a decision-making process, including for example profiling of risk versus measuring direct accountability.
- There are trade-offs in using a 'traffic-light' approach to measure risk exposure and association versus using a more continuous scale. Thresholds between categories, such as red/yellow/green, are somewhat arbitrary. The same categorisation can often be achieved through different means if multiple metrics are used.
- Achieving an appropriate balance between the aggregation and disaggregation of different dimensions that make up a risk score depends on the user in question. Considerations include whether that user has an interest in improving the approach used to calculate risk, and where they are in the supply chain. Users higher up in the supply chain are often

better served by more aggregate measures, while users closer to the impact are often better served by more disaggregated measures that can be more accurately aligned with different mitigation and response measures.

- It is a fundamentally different research and policy challenge to assess risk exposure, and draw inferences about differential responsibility, across different actors in the same stage of a supply chain (such as traders) versus actors who occupy different stages in a supply chain (such as producers, traders, retailers). Recalling at the same time that many actors who benefit from the production or trade of agricultural commodities are not directly involved in the handling of commodities themselves.

3. Focal questions

3.1. Linking impacts and risks of production with supply-chain actors

Focal question: How can we confidently associate known environmental and social impacts in production regions to downstream supply chain actors (including traders and consumer facing companies)?

Challenges:

- How can impacts at territorial level, such as deforestation, be linked to a certain commodity using crop-specific land-use expansion and land conversion data?
- How can an area be linked to a particular company given limitations in the spatial resolution of supply-chain data, especially for bulk commodities like soy, and the fluidity of both land ownership and sourcing patterns?
- How can impacts be linked to a discrete time-frame in which those impacts occurred, and what is the most robust way to treat and interpret historical deforestation? Considerations include deciding on an appropriate amortization period and cut-off date, recognising that this is a normative choice, and that using a range of options is perhaps necessary to provide the most robust decision support.
- How should we treat and consider expected and future deforestation?
- What kind of methods and visualization techniques are appropriate to link different types of impacts and other geographic information to downstream supply chain actors? These include quantitative cumulative measures such as deforestation and land-based GHG emissions, non-cumulative scaled-indices such as water scarcity, and qualitative or categorical measures such as organic or non-organic modes of production?
- What would be a more unified and consistent approach for linking actors to different kinds of impacts, noting that different actors are sensitive to different kinds of impact?

Insights and options:

- **There are three main approaches for associating supply-chain actors to production impacts.** Each approach serves a different purpose. The same user may have a need for all at different stages in a decision-making process. While the performance of territories is what ultimately matters in a sustainability agenda, the performance of actors is seen as a means to this end. The three main approaches are:
 - **A territorial or jurisdictional assessment** that is not concerned with accountability or attribution of responsibility¹, but instead with providing information for assessing the risks and opportunities of being associated with a given production region. For example, this is applicable when a downstream actor is making new sourcing decisions or a government is identifying potential areas of concern. From a buyers' perspective, information on territorial risks and performance for an entire country or sector, such as soy produced in Latin America, can be invaluable to inform sourcing and investment decisions. From a government perspective, the same information can be used to identify those actors associated with areas of particular concern, as well as areas that are showing improvement.
 - **A commodity-specific assessment** that is focussed on demonstrating the accountability of specific sectors or actors, such as compliance with an agreed standard like the soy moratorium, and assessing changes in the performance of specific actors over time. This approach depends on data availability. Here, the impact is tied directly to the commodity of interest, and aims to reduce the uncertainty in the sub-regions and time periods within which a given actor is active.
 - The association of deforestation and other impacts to a given commodity can also be adjusted using data on changes in yield over time. This can help to identify how exports of commodities can increase without an increase in the area utilised for soy production.
 - Linking deforestation to a particular crop with a distinct footprint signature in satellite data, like soy, can be improved based on the size of deforestation patches. Distinguishing between smallholders versus industrial crop areas can also provide useful information to refine risk assessments.
 - **An actor-specific assessment** that attributes deforestation impacts to a specific actor requires property-level data that is often not available.
 - An option is to use data on sourcing properties that is provided voluntarily by companies. The transaction cost for platforms like Trase to do this, however, is huge - unless the burden of proof can be shifted to companies sufficiently so that they pay much of this cost themselves, to 'take themselves out of the picture'.
 - Alternatively, when property level data is not available, the actor-specific assessment can be based on statistical analysis to see whether the actor contributed to significant positive or negative changes in its key sourcing territories. In other words, the association rather than attribution of impacts. This approach is suited for large operators that source from multiple locations (see section 3.4).

¹ Nevertheless, in specific circumstances, the responsibility of particularly dominant supply-chain actors can be inferred already at this level. For example, monopsony situations where most of the forest-risk commodity produced in the territory goes to a single actor/group of actors. This type of situation may not be so uncommon when looking at smaller, local jurisdictions.

- **Beyond the assessment of the direct commodity driver of deforestation is the issue of underlying deforestation drivers.** This is about understanding underlying mechanisms of cause-effect that influence the direct causes of deforestation, such as transportation infrastructure planning. Empirical observations that link different actors to different spatial-temporal patterns of environmental change can provide a rich source of hypotheses for deepening our understanding of the factors that shape supply-chain dynamics and determine the effectiveness of governance interventions.
- There are a range of options to determine the total risk that can be associated with a given supply chain sector or actor. These are dependent upon two main choices, regarding:
 - **Either one or multiple amortization periods.** This measure depends on both the importance placed on past deforestation, which is a governance choice, and the importance given to indirect land use change, or ILUC. A longer amortization period confers more weight to ILUC. An alternative approach is to use a weighted recentness index, which is currently being trialled in Global Forest Watch's soy risk model. Past deforestation is a critical issue for perennial crops like oil palm that only enter into production several years after planting and hence any possible deforestation that may have occurred then.
 - **Cut-offs for specific amnesty or threshold dates.** This includes cut-offs that are policy prescribed, such as the soy moratorium. This measure could be open-ended to include all historical deforestation. Cut-off dates are commonly used by the private sector for certification. The risk of using future cut-off dates such as those used in 2020 zero deforestation commitments is that they may generate a perverse incentive to deforest more before that date.
- Different metrics can be used to measure the deforestation due to the production of a given commodity including:
 - Hectares of deforestation, or natural vegetation conversion, with a caution against the use of tree loss and tree gain data together to create net deforestation
 - Hectares of deforestation per tonne of soy produced, or deforestation intensity
 - Scaled measure of hectares of deforestation per hectare of municipality area, which has a greater dilution effect in larger areas
- Different metrics can be used to measure the efficiency and dominance of that commodity, including:
 - Hectares of soy per tonne of soy exported. This is hard to interpret due to the use of the same land for multiple crops in cycles.
 - The scaled measure of dominance of the total agricultural production
- There are at least four types of geographic indicators that are of relevance to downstream actors and those assessing supply chain sustainability:
 - Social and environmental impacts, including those that are:
 - Specific to the production activity of interest
 - General, regarding the condition of the wider territory
 - Actor behaviour that is often related to performance, including:
 - Agricultural performance, efficiency and responsible practices
 - Environmental compliance and interventions
 - Governance measures related to enabling and disabling conditions
 - Territorial characteristics, including:
 - Intensity of land use and crop diversity
 - Ecosystem type
 - Infrastructure

- There can be substantial unintended consequences depending on how information on different impacts is used:
 - There are two main choices of actor response: to move elsewhere, or stay and invest. The former carries the risk of precipitating a twin-track system and generating leakage.
 - There is an opportunity to support more nuanced decision-making by providing information that is tailored to the actors and governance conditions of a specific territory of interest.
- There is value in predictive models that reflect future deforestation risk and likely hotspots of future deforestation. This is based on patterns of infrastructure development and expansion, for example, to encourage actors, such as investors, to adopt preventive measures.
- Considerations related to the future expansion of commodities and treatment of commodity suitability maps:
 - It is recognised that ‘Go-NoGo’ mapping, for example TNC’s RTRS mapping, is fraught with difficulties. Existing attempts have failed to be relevant to producers and other actors, as they don’t take into account the contextual factors such as social and political aspects that shape decision-making. It is impossible to model future behaviour in this sense.
 - The demarcation of ‘Go’ areas confers substantial responsibility. Information offered by platforms such as Trase should be relevant to multiple rural development opportunities and not just the expansion of a single commodity.
 - A valuable exercise is contrasting and reconciling scenarios of future commodity demand with the constraints imposed by different sustainability commitments that identify barriers to delivery.

3.2. Sharing risks and responsibilities across different stages of a supply chain

Focal question: what are the most robust approaches for linking production impacts, and the risks embedded in those impacts, to actors in different stages of a supply chain?

Challenges:

- Impact and performance measures can be associated with all steps in a supply chain, not just the production regions. This poses a challenge in determining to what extent such measures can be combined and normalised to assess the impacts and performance of the entire supply chain, not just the production landscape.
- There is a general bias towards the assessment of risks and performance of production sites.
- What is a robust approach to calculate and report on risk exposure for actors that are far removed from production regions? This includes importers and traders that have myriad and dilute connections with multiple regions and other actors.
- How can the challenge of ‘over-dilution’ of actor responsibility be addressed? This issue deals with impacts in a given place being attributed and shared across so many actors that no one actor feels sufficiently associated to engage.

- How can the tension be resolved between the strength of association to an impact (e.g. highest for producers) versus sharing the costs of addressing the impact across multiple actors versus the transaction cost of engaging multiple actors? This tension is revealed in the theory of change of many actors engaged in efforts to improve the sustainability of supply chains, with many placing a strong focus on one group (e.g. producers, or traders).
- What is the best way to address the fact that many actors feel 'squeezed' by demand for sustainable produce downstream while having a limited supply of sustainable production upstream? The crux of this issues is that prices are often not redistributed effectively so that some actors bear a disproportionate cost of improving the sustainability of production practices.
- What is the most effective way to address the effects of cross-contamination where a given supply chain actor is associated with unsustainable practices in one production region but not the region where a shipment of particular interest was sourced from ? For example, how can one reliably balance the assessment of the sustainability of a shipment and/or the sustainability of an actor?
- Many actors benefit from the production and trade of a given commodity but are not involved in the supply chain directly. For example, governments and companies that provide the inputs of seeds and fertilisers. What is the most effective way to engage these actors?
- There are no readily available datasets that provide systematic coverage of the flow of traded commodities between importers and manufacturers and retailers. What is the best way to address this problem?

Insights and options:

- A case can be made for a differential distribution of responsibilities for addressing supply chain impacts based on:
 - Differential benefits. These include monetary benefits. Which types of actors manipulate a large portion of the added value?
 - Differential agency. This includes, for example, the dominance of a given actor or supply chain step in processing the material throughput of a given commodity.
- Distributing responsibility for sustainability action to actors across a supply chain is valuable because it:
 - Exposes the roles of hidden classes of actors, including shippers and port authorities
 - Engages a broader set of actors to share costs and responsibilities
 - Helps to identify potential leverage points, targets and pressure points
- The use of mitigating factors to adjust the impacts associated with an actor based on the practices and behaviour of that actor downstream. This includes certification measures, productivity data and information showing the nature of activities of smallholder suppliers versus large-scale suppliers. An additional consideration is assessing the risks of taking this approach, including the fact that mitigating factors are only available to actors who have the influence and power to access them.

3.3. Analysing actor performance

Focal question: How can the different measures of impact, and the risks embedded in those impacts, be aggregated to assess changes in the performance of supply-chain actors?

Challenges:

- What is the best way to overcome difficulties in tracking the performance of a given actor committed to zero deforestation over time without having precise data on sourcing locations? It is relevant to consider that data will never be available at scale and for a significant proportion of a sector.
- Can the likelihood that companies will deliver on their zero deforestation commitments be assessed by projecting year-on-year changes in the amount of deforestation in the shifting set of regions that they source from against the target year of their commitment?
- Over what time scales should performance be measured, and what is the best way to assess whether progress towards a target is satisfactory?
- What is the most effective way to assess the performance of a given company that is involved in the production and trade of multiple commodities, given varying types of commitments?
- What is the best way to address the problem posed by the masking effect of domestic market, and the leakage from exports to domestic markets following increased exposure of export markets, such as in the case of the soy moratorium (which is driven by concerns of export market)?

Insights and options:

- There is a need to develop proxy performance indicators given the difficulties in assessing actor performance over time when lacking property level data. For instance, to assess 'deforestation free soy' – the magic metric buyers want to have. Examples of proxy performance indicators are:
 - The correlation of the relative dominance of a given company with the performance of the places they are connected to. Are regions where company A sources more than 80% of its trade performing better than regions where company A is absent or responsible for less than 20% of its trade?
 - The proportion of soy traded from regions that have zero or a very low deforestation rate. This is a conservative measure.
 - The proportion of soy exported from regions that have a declining relative deforestation rate. This is a slightly less conservative measure.
 - A measure of deforestation intensity (hectares per tonne of soy exported) to account for improvements in productivity and soy yields, versus expansion
- Beyond assessing proxy indicators of change in performance, it is important to understand the differences in company strategies and the factors that drive company behaviour, including:
 - The relative stickiness of a company's relationship with a given place. It is also important when considering the suite of other supply-chain actors and the typical management conditions of a given place. Understanding these relationships can help qualify the factors that underpin a company's performance. Furthermore, it can provide information on the extent to which longer-term relationships are being developed with a

given place. This is opposed to the strategy of delivering improved performance by changing sourcing patterns, which has different consequences for net impacts at scale.

- It is useful to take into account that many soy farms are, in essence, chicken factories, and it may make sense to map them as such.
- There are opportunities to link company disclosure platforms like CDP to empirical performance assessments

3.4. Monitoring policy effectiveness

Focal question: How do we assess the effectiveness of an intervention and the causal attribution of change in performance due to a given intervention?

Challenges:

- Many theories of change of market intervention on supply chains trace impacts to producers, but fail to consider what can happen beyond that point. This includes the myriad types of leakage and other displacement effects that can occur, such as:
 - Activity leakage following an intervention – people moving away, resulting in land-use displacement
 - Market leakage following an intervention – actors elsewhere expand and increase their intensity of production
 - Rebound effects following improvements in productivity – increased investment in a region due to increased profitability
 - iLUC that follows profitable LU, and in turn replaces less profitable LU, which then replaces native habitat

Insights and options:

- It is more feasible to assess the effects of a given cause rather than the multiple causes of a given effect. In other words, studies that seek to understand the diverse drivers of deforestation are much less insightful than studies that seek to disentangle the relative effect of a given driver. For example, the effects of government intervention and the interests that shape these decisions.
- The effects and risks of leakage are of more relevance to actors that have an interest in, and responsibility for, multiple supply chains or an entire sector, such as governments and investors. This is also the case for supply-chain companies that have made commitments to have a net positive impact. That is, to avoid localised benefits being offset by displacement impacts elsewhere.
- An annual reporting and assessment exercise, such as the one proposed by Trase, should include the tracking of key indicators of leakage and leakage risk. This includes infrastructure investments, migration patterns in response to major interventions, such as the link between leakage and displacement effects and consumer countries and companies.
- A valuable research exercise would be to set null models of the expected migration routes of sourcing companies in response to economic drivers such as cheaper land and labour and different patterns of legal enforcement. Over time, the exercise could track the response of data to models and the relative importance of push-pull factors in shaping spatial-temporal dynamics of sourcing companies.

4. Priorities for future work

- Improve the articulation of strategic questions to provide signposts for ongoing research and practice around supply chain sustainability.
- Develop more standardised frameworks for assessing the link between actors and impacts. This includes the treatment of different levels of data availability, priorities in terms of specific impacts and the importance of historical impacts, as well as the position of actors in a supply chain.
- Work towards a more consistent approach regarding common indicators and metrics of those indicators, and the identification of indicators in need of testing.
- Integrate more consistent language regarding impacts, risks, and responsibilities.
- Engage with a group of users and decision-makers in the public and private sectors to reflect on the usefulness and attractiveness of the proposed approaches and metrics, at a later stage in 2017.
- Work on the integration of multiple data visualisation platforms, including through interoperability, user entry points, stages of decision support, the use of open data, data builders and data downloads.
- Consider in further depth the main performance indicators and outline of an annual assessment exercise. This is related to the particular issue of progress towards the 2020 commitments to end deforestation in global supply chains.

Disclaimer. This internal working paper has not been edited. Please review the ideas presented, knowing that the contents will be edited at a later stage in development.

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