SEI Stockholm Environment Institute

SEI-PCS: Spatially Explicit Information on Production to Consumption Systems

P2CS research
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This brief describes SEI-PCS, a modeling approach that has informed important work under P2CS.

The SEI Initiative on Producer to Consumer Sustainability (P2CS) is an SEI-wide research initiative that connects the sustainable production and sustainable consumption agendas. P2CS explores the links and interactions within production-to-consumption systems – encompassing global flows of commodities and the impacts, dependencies and wider dynamics associated with production and consumption – in order to find new opportunities to enhance their sustainability.

The initiative enters its third implementation phase in 2019.

Countries, companies and individual consumers are increasingly aware that their consumption could be linked, via supply chains, to environmental and social sustainability impacts in distant parts of the world. However, most of the footprinting methods available prior to 2015 critically lacked detail – of the connections between consumption and production, and of how particular commodity flows were linked to sustainability issues in specific production sites. Instead, they estimated footprints at country level, based on assumptions and macroeconomic figures.

This limited their value for policymaking, attributing responsibility and taking preventive action, given the often localized nature of issues like deforestation, as well as the heterogeneity of landscapes and vulnerability that can exist, particularly in large countries like Brazil.

SEI-PCS (for Spatially Explicit Information on Production to Consumption Systems) is a modeling approach developed at SEI.[1] SEI-PCS allows for fine-scale subnational assessments of the origin of traded commodities and the socio-environmental impacts embedded in them, such as carbon emissions, local pollution or biodiversity loss. It recreates supply chains and attributes sustainability impacts to commodity flows and actors, using a combination of detailed production data at subnational scales, information on domestic trade flows, customs data and international trade flows between countries.

Applications of SEI-PCS

Footprinting – SEI-PCS improves on traditional footprints by allowing consumption to be linked with local socio-environmental dynamics and relevant supply chain actors at the scale relevant to the impacts being assessed.

Supply chain analysis and traceability – SEI-PCS reveals links along complex supply chains back to primary producers. This makes it easier to identify supplier regions/individuals, as well as hidden risks and vulnerabilities to companies and consumers. Similarly, producers can better understand the fate of, and markets for, their commodities. The first Yearbook of the Trase initiative (see box), published in 2018, showcased this capability with a focus on soy from Brazil.

Temporal dynamics of production and consumption – SEI-PCS is well suited to analysing how changes in sourcing patterns affect impacts on the ground. For example, in Trase, SEI-PCS data has helped to monitor the dynamics of soy-linked habitat loss in the Matopiba region of

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Brazil, linking it to rising demand from China and identifying the soy traders most exposed to deforestation risk in their supply chains.

SEI-PCS can also be used in a range of other policy-relevant analyses, including of the potential trade-offs involved in increasing trade as a strategy for climate adaptation, unintended consequences and implications of trade-related policy for local communities and ecosystems in producer countries, and the coherence of consumer countries' policies across sectors (e.g. on climate, trade, development and rights promotion). For example, it is being used to demonstrate the existence of "leakage" effects from flagship environmental policies aimed to preserve the Amazon rainforest; Trase is analysing how these measures have resulted in huge soy deforestation rates in neighbouring non-Amazonian areas, and how governments need to redesign their policies to avoid such undesired effects.

FROM SEI-PCS TO TRASE

SEI-PCS was first presented in a 2015 article in the journal *Ecological Economics*. This article illustrated the model's potential by linking imports of Brazilian soy by countries and companies around the world back to the municipalities where the soy originated. Building on this analysis, and adding data on deforestation and other sustainability issues in those municipalities, SEI-PCS gave rise to Trase (for Transparency for Sustainable Economies), an initiative led by SEI. Its flagship open-access platform, Trase.earth, was launched at COP22 in Marrakech in 2016.

Trase.earth offers companies and countries unprecedented transparency on their supply chains of Brazilian soy and a growing-number of agricultural commodities linked to tropical deforestation in Latin America and Indonesia. As well as identifying source regions, it estimates the "deforestation risk" that actors along the supply chain are exposed to as a result of their sourcing patterns.

Trase is attracting increasing attention from multinational companies sourcing these forest-risk commodities, as well as investors, governments and civil society. It is also being used to assess the progress of zero-deforestation commitments made by governments and companies, as well as a range of other policy-relevant analyses.

Figure 1. A screen shot from the Trase.earth platform, which uses SEI-PCS to trace the path of forest-risk commodities from the locality of production to the first country of import. This shows how "deforestation risk" is transferred from soy production in the Brazilian state of Tocantins via exporters and importers to China, the country of first import