COUPLED

OPERATIONALISING TELECOUPLINGS FOR
SOLVING SUSTAINABILITY CHALLENGES FOR LAND USE

Deliverable D6.2

Toolbox to assess, model, and govern telecoupled land systems

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Deliverable

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About COUPLED

Human consumption of food and agricultural products has a significant impact on the environment and the societies in the regions where they are produced. Different sectors, consumers, businesses and politicians are increasingly demanding more environmental and social sustainable land-use both inside and outside Europe. Yet, there is increasing recognition of the limitations of current research approaches to adequately understand and address the increasing complexity of land system dynamics, which are often characterized by strong non-linearity, feedback mechanisms, and local contexts, and where places of production, trade, and consumption of land-based products are increasingly separated.

Coordinated by the Humboldt-Universität zu Berlin, COUPLED is a European training network in order to better integrate research, innovation and social responsibility framed around the concept of telecouplings.

COUPLED trains Early Stage Researchers capable of:

- Understanding processes and actors that influence land-use in an increasingly interconnected world
- Considering distant, unexpected feedbacks and spillovers and to account for their social and environmental impact
- Fostering new and enhanced governance measures that can shape land-use couplings to deliver more sustainable outcomes of land use decisions

For more information see www.coupled-itn.eu

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1. Introduction

COUPLED is an Innovative Training Network that puts the approach of telecoupling into action for contributing to a better understanding of processes and actors that influence land use in an increasingly interconnected world. Individual research projects, led by fourteen early-stage researchers (ESRs), are working on overarching, interrelated research questions:

1. Processes: How inter-dependent are land and resource systems in today's world, and what are new or unexpected actors and processes creating the telecouplings that produce these dependencies?

2. Distance: How is sustainability governance of land use and land-based products affected by differences in the type of linkages and telecouplings and the scale at which they operate?

3. Impacts: Which enabling conditions are required to generate opportunities for a more sustainable allocation of resources in a telecoupled world?

An important element of COUPLED is to translate research results into the language understandable and tools usable by different actors. An important aspect of this, is the development of interactive web-based platforms that guides users from different sectors to relevant datasets and tools concerning the globalization of land use. When the COUPLED proposal was developed, the proposal suggested to create an online interactive Telecouplings Toolbox including data, methods, and tools to assess and model telecouplings. Such toolbox should enable different actors (e.g. private companies, NGOs, government bodies, international organisations, scientific institutions) and different sectors (e.g. agriculture, forestry, conservation) to identify methods capable of capturing the globalization of land use and the flow of land based products as well as measure progress towards more sustainable outcomes. The toolbox was to be based on insights from the individual ESR projects. However, shortly after COUPLED started, COUPLED project partner, Stockholm Environment Institute (SEI), heavily invested in the development of a web based, interactive, toolbox capable of tracing land based products from place of consumption to producer farm. The level of detail in what is now known as Trase (trase.earth) is impressive for almost all land based products and highlight for producers, policy makers and researchers how the world of land based products is telecoupled. It list methods, volume, data sets available and has an interface that is extremely user friendly. Since 2016 multiple staff has worked fulltime on this tool, including COUPLED members Javier Godar and Toby Gardner. ESR students co-supervised by them as well as being seconded with the SEI have used and helped give input into Trase. As have PIs and especially Patrick Meyfroidt at UCL. A second similar initiative, but less well funded, was initiated just before COUPLED started. This is based at the research group of COUPLED Advisory Board member, Jack Liu, at Michigan State University, USA. Their Telecoupling Toolbox was put online in 2019. This toolbox is particularly good at illustrating telecouplings as it is very interactive and keep expanding as significant resources are also poured into this toolbox. Both initiatives are, as mentioned, closely linked to the COUPLED project via partners, beneficiaries, and Advisory Board members. The existing toolboxes are moreover freely available and will persist beyond the lifetime of COUPLED. They are also the results of work dedicated solely to the purpose of developing a web based interactive interface focused on the telecoupling of land based products. Therefore, with the present Deliverable 6.2 – and as agreed by the REA on 12.06.2020 – COUPLED will not add another Toolbox. This is not needed and we do not have the resources to make a better one. COUPLED rather refer to the existing ones doing the job (and even better) we envisioned for this Deliverable 6.2.

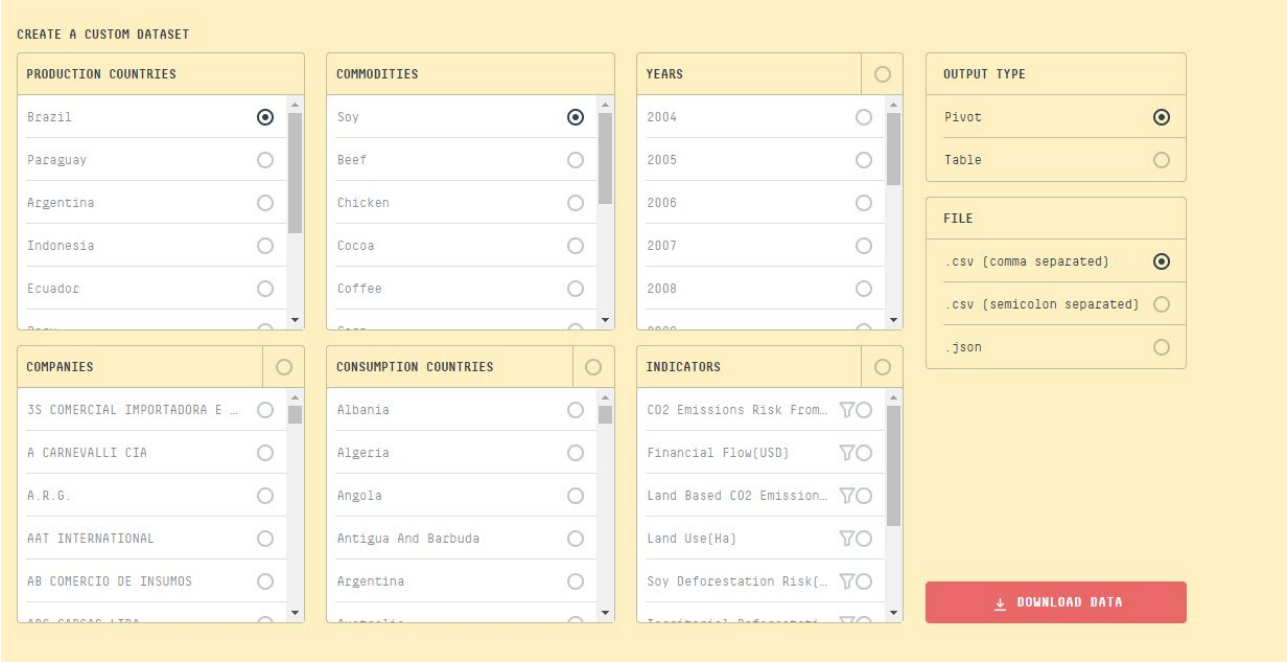
2 Existing toolboxes to assess, model, and govern telecoupled land systems

2.1 Trase.earth

Trase (https://trase.earth/?lang=en) is a transparency initiative that enables governments, companies and others to better understand and address the environmental impacts linked to supply chains. It is co-founded

by COUPLED partner Stockholm Environment Institute in 2016 and co-lead by COUPLED beneficiary Catholic University of Louvain (among others). It provides a supply chain mapping approach using disparate, but publicly available data to connect consumer markets to deforestation and other impacts on the ground. Trase maps supply chains and financing of key commodities from entire countries and regions, such as Brazilian soy or Indonesian palm oil exports, providing a wall-to-wall map of the central stages of a supply chain.

Recently, Trase has become a major public supply chain information system for companies and investors (e.g. commodity traders), governments (producer countries and consumer countries), and other actors (e.g. civil society organisations) seeking to transition towards more sustainable production, trade and consumption for the world´s major forest-risk agricultural commodities. Trase aims to cover over 70% of the total traded volume of major forest risk commodities, including soy, beef, palm oil, timber, pulp and paper, coffee, cocoa and aquaculture. The initial focus of Trase is on Latin American soy, followed by beef in Argentina, Brazil and Paraguay, palm oil in Indonesia and Colombia and coffee in Colombia. Additional countries and commodities will be added as the platform develops.



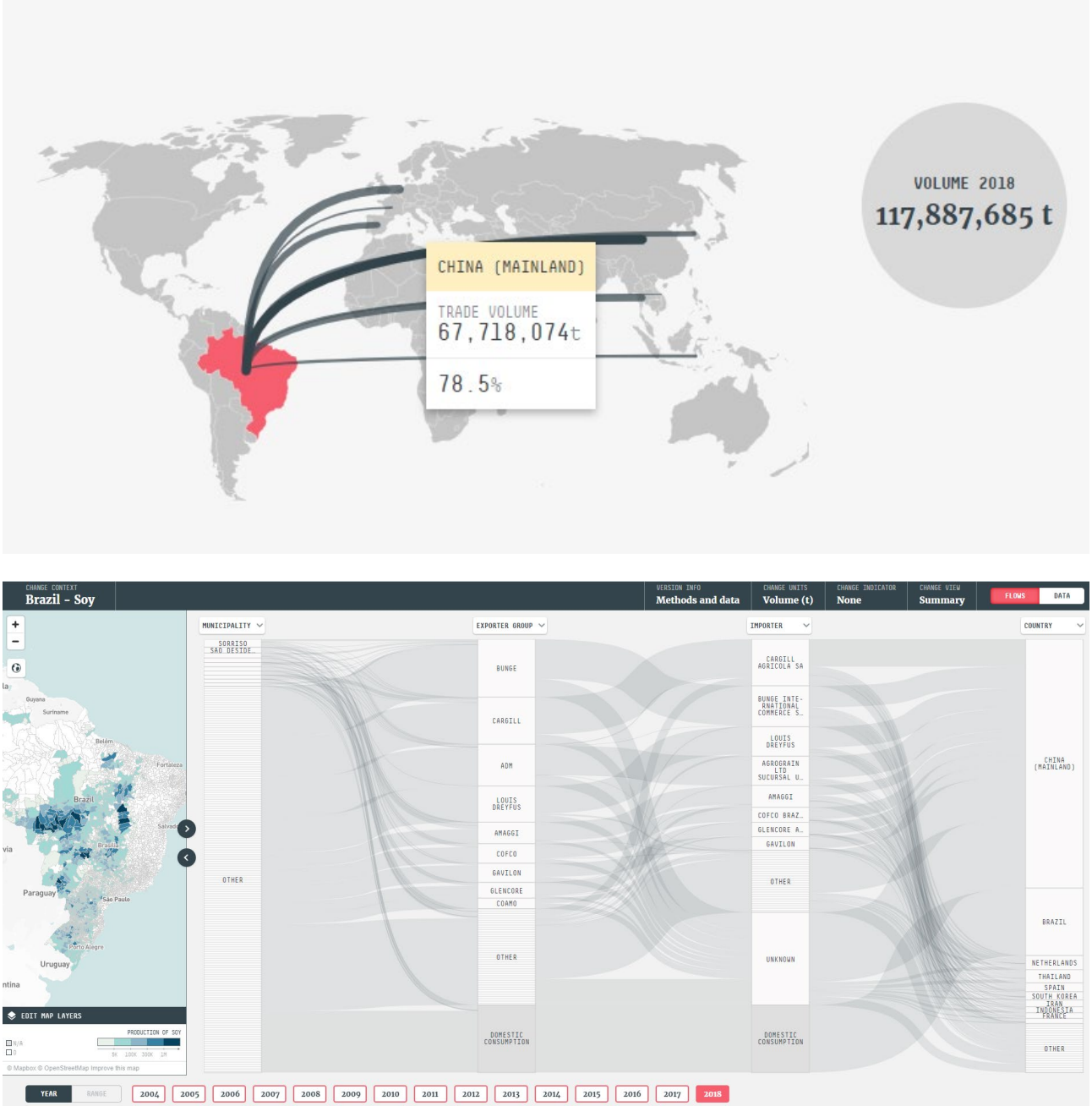


Figure 1-3. Example how to use Trase's Data tool to create a custom dataset of the supply chain and financing of key commodities, such as Brazilian soy (taken from https://supplychains.trase.earth/data)

2.3 Telecoupling Toolbox (Michigan State University)

The Telecoupling Toolbox (https://telecouplingtoolbox.org/) – designed at Michigan State University among others by COUPLED Advisory Board Member Jianguo Liu in 2019 - is a suite of geospatial software tools and apps developed to map and identify five major interrelated components of the telecoupling framework: systems, flows, agents, causes, and effects. The modular design of the toolbox allows the integration of existing tools and software to assess synergies and tradeoffs associated with policies and other local-to-global

interventions. The Telecoupling Toolbox is free and open-source, available to researchers and practitioners as a platform to address globally important issues, such as land use and land cover change, species invasion, migration, flows of ecosystem services, and trade of goods and products. Next to an ARCGIS Toolbox and GEOAPP, the toolboxes provides furthermore case studies like “The Brazilian-China Soybean Trade Telecoupling” (Figure 4; https://telecoupling.msu.edu/geo-app/agri-trade/)

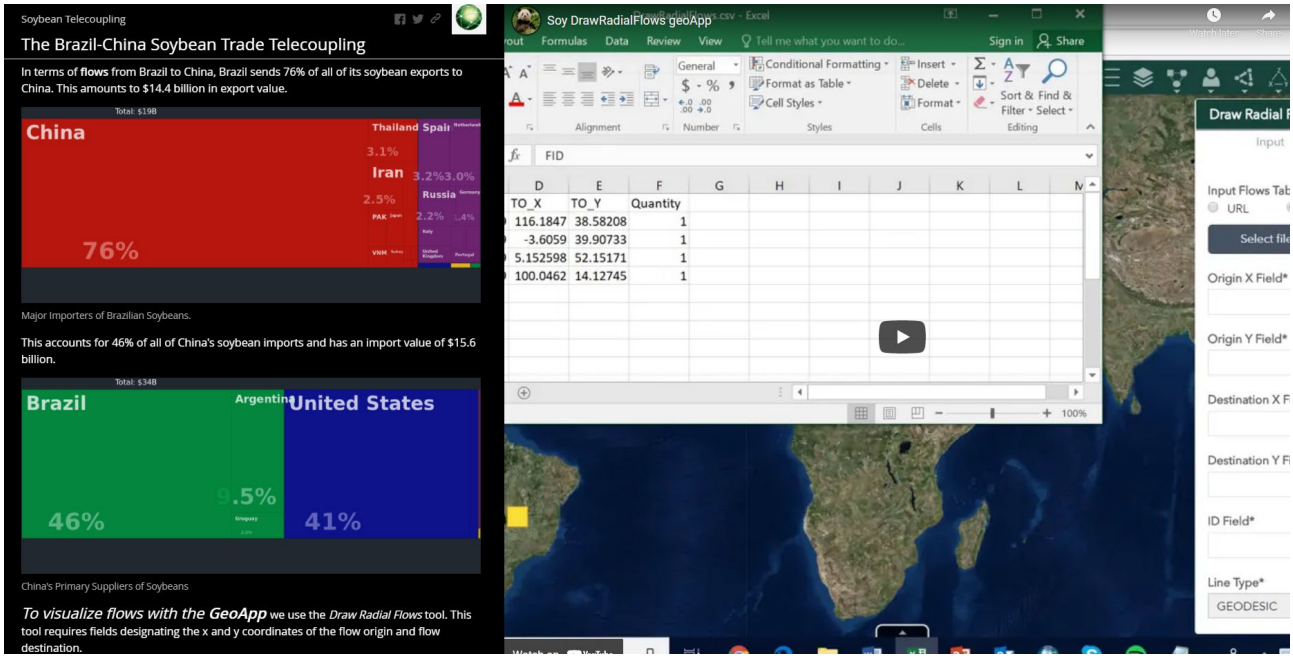


Figure 4. Case study screenshot taken from the Telecoupling Toolbox as telecoupling example for Brazilian-China soybean trade (https://telecoupling.msu.edu/geo-app/agri-trade/)