**Modelling livestock production and GHG emissions: *an assessment of the global environmental impact of embedded soy, palm oil and maize***

**Background**

Globally, livestock and livestock feed use approximately 80% of the world’s agricultural land, yet livestock provide only 20% of the calories consumed by humans. The production and consumption of livestock – and the crops that are grown to feed them – is one the principal driver of [deforestation](https://files.wri.org/d8/s3fs-public/estimating-role-seven-commodities-agriculture-linked-deforestation.pdf) and ecosystem conversion, agricultural greenhouse gas emissions (including [methane](https://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them)), and biodiversity loss globally. Where livestock production is intensive, local environmental impacts (e.g., water pollution) can be severe. The rising demand for animal protein, and the intensive way it is increasingly produced risk future exposure to novel [zoonotic diseases](https://wedocs.unep.org/handle/20.500.11822/32316;jsessionid=7BD248A5533015BC05A17E82BB3466D5).

Livestock can play a key role in regenerative land use, with ruminants in particular having a unique capacity to turn low nutritional value fodder into high quality protein. However, the scale of production globally far exceeds a sustainable limit.

WWF wishes to further understand the way in which the production of global commodities, trade and consumption of livestock and livestock feed is driving local and planetary impacts on the environment. The starting place is soy – a crop that is principally fed to monogastric species (poultry, pigs) and which is responsible for biome-level conversion in some of its production areas. However, beef (and dairy) production is the single largest driver of deforestation, and so must be considered, whilst other feed crops (maize, wheat, palm kernel expeller) are also widely used for feed and their growth has significant environmental impacts.

WWF is interested to commission a study that can analyse this issue, while proposing a model to assess GHG emissions linked to livestock production (embedded soy, palm oil, maize). This will help assess costs linked to production through the lens of climate change, and support wider discussions on the impact related to NDCs, trade agreements and private sector commitments.

**Research questions**

The specific research questions to be addressed are:

1. What are the major trade flows worldwide of livestock products and livestock feed?
2. What are the impacts of production of feed and livestock products on net exporter countries, in terms of deforestation, GHG emissions, and ecosystem services?
3. Where are the expanding frontiers of production and consumption?
4. How can the contribution of embedded soy and other feeds be Incorporated Into existing policies and legislative frameworks (such as the EUDR, UK Due Diligence of forest risk commodities)
5. What policies/frameworks (if any) are considering impacts of production in livestock products and feed?
6. How can ESG metrics (building from existing efforts of investor driven disclosure CDP on companies and more recently banks and public assessments by Global Canopy and ZSL SPOTT ) incorporate the environmental and social risks of livestock and livestock feed trade in the finance sector?

**Scope**

**Geographical scope:** global overview, but with impacts and ‘frontiers’ focused on a small number of countries critical to suppling global demand.

**Livestock species:** cattle (including dairy); pigs, chicken.

**Feed:** maize, soy, palm kernel expeller.

**Proposed process**

The work is separated into five phases:

**Phase 1: Trade flows**

The trade in livestock products and feed will be quantified using [UNCOMTRADE](https://comtradeplus.un.org/TradeFlow) data and baseline Information provided by [TRASE](http://resources.trase.earth/documents/zuErmgassen-et-al._2020_PNAS.pdf), with the processed and manufactured products converted into ‘raw material equivalent’. This will provide a full picture of the flow of livestock and feed products and can be assessed both by quantity and by value, as appropriate. It will further allow the identification of those countries that are driving global export and import.

**Phase 2: Impacts of production and consumption**

The impacts of production will be examined in two ways. Firstly, a global analysis will estimate the land footprint and where possible the deforestation risk and GHG emissions from livestock and feed production. Secondly, key hotspots of production and the ‘offshored’ impact of key consumer countries will be analysed in greater detail, including deforestation, GHG emissions, social impacts and impacts on environmental services. The information available is likely to be varied according to commodity and geography (e.g., soy and cattle from Brazil have detailed GHG and deforestation estimates available from [TRASE](https://www.trase.earth/), whereas similar data tends to only be available for feed crops elsewhere, such as [Pendrill *et al*. (2022)](https://zenodo.org/record/5886600#.Y9D7YOzP3J8) or the [Blonk LUC Impact Tool](https://blonksustainability.nl/tools/LUC-impact)),

**Phase 3: Expanding frontiers**

Expanding frontiers of livestock and feed production will be identified from two sources: trends in [FAOSTAT](https://www.fao.org/faostat/en/) data and other data sets like GFW, and a search of the policy and environmental literature to discover where policy and/or corporate commitments herald future expansion in production. The potential impacts of production (GHGs, ecosystem conversion, biodiversity) will be assessed for a number of key expansion frontiers.

**Phase 4: Opportunities to influence existing regulations on deforestation and conversion**

This phase will identify policy loopholes that facilitate the trade in livestock and feed, including tariffs and environmental criteria in trade agreements and relevant regulations (EUDR, UK DD, and US and China regulations, and considering key regulations in producing countries as well). The way that these policies and mechanisms (and their weak implementation and enforcement) affect the global trade in livestock and feed will be assessed.

**Phase 5: Development of model to assess GHG emissions**

Development of a model to assess GHG emissions linked to livestock production (embedded soy, palm oil, maize).

**Deliverables**

Three deliverables are anticipated. They will be developed in close consultation with WWF, with at least one round of feedback sought before finalising the text:

1. A technical report (c. 50 pages) that describes the findings and methodology in detail.
2. A summary report (c. 15 pages) that summarises the main findings, and which includes infographics.
3. A policy brief (c. 1 pager) on key recommendations for policy makers

**Budget**

£40,000 exc VAT / £48,000 inc VAT

**Timeline**

ToR published: w/c 24/04/23

Responses returned to WWF: by May 19th, 2023

Chosen supplier awarded: June 15th, 2023

Contract set up and onboarding onto WWF system: June 23rd, 2023

Project start date: July 1st, 2023

Deliverable dates:

* Technical report: End of September 2023
* Summary report: Mid October 2023
* Policy brief: Mid October 2023

Final Project Submission: End October 2023

Reporting is expected on a monthly basis via zoom or in person, but the WWF team will be available for weekly or bi-weekly discussions if/when needed.

**Proposal requirements**

In your response, you must be able to demonstrate and evidence:

• Understanding of the brief and propose options for the approach. Please outline possible time frames and requirements of us in a high-level project plan

• Depth and breadth of expertise in this field in the charity /not for profit / NGO and commercial / private sectors. Please include names of recent clients for who you have delivered similar work

• A strong team that can provide responsive service – i.e., not key person dependent – continuous service available. Please provide short biographies for all those who would be involved on the project

• A strong alignment with WWF’s vision and mission with values that respect diversity, equality and inclusivity and evidence of partnership working. Please provide a short statement on this and how you evidence your values in your work

• Value for money; competitive pricing for expertise. We need fees to be clear and structured in a flexible way. Please state day / hourly rates and price per project element, ideally with capped fees

Proposals need to be submitted to:

John Dodsworth – Drivers Initiative Lead WWF UK – JDodsworth@wwf.org.uk

Veronica Robledo – DCF Supply Chains Lead WWF – Vrobledovallejo@wwf.org.uk

by **May 19th, 2023**

*Contracting with WWF-UK:*

*It is our requirement that an appointed external partner adopts our standards terms and conditions for engaging with us.  These are included within the tender documents.  Please confirm you are willing to accept these terms. Should you have any amends you wish to make, these will need to be discussed with the WWF-UK legal team.*

*WWF-UK asks all suppliers to comply with the Supplier Code of Conduct and WWF-UK 3rd Party Expenses Policy. Both documents are enclosed within the tender pack. Please confirm your acceptance of both.*

*All contracted suppliers are required to register on Panda Purchasing (WWF-UK’s PO and invoice system). Should you be successful in your bid, please confirm you will be willing to register on the system.*

\*For any questions or comments, please reach out to:

* John Dodsworth – Drivers Initiative Lead WWF UK – JDodsworth@wwf.org.uk
* Veronica Robledo – DCF Supply Chains Lead WWF – Vrobledovallejo@wwf.org.uk