



**30 NOVEMBER**

**PRINCE 2**  
**WORKSHOP**



**TRACKING SWEDEN'S  
CONSUMPTION-BASED  
ENVIRONMENTAL  
IMPACTS**

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# **PRINCE - POLICY-RELEVANT INDICATORS FOR NATIONAL CONSUMPTION AND ENVIRONMENT**

The **PRINCE** – Policy-Relevant Indicators for National Consumption and Environment – project has developed a new framework for monitoring the environmental impacts linked to Swedish consumption – both inside and outside Sweden’s borders – using the latest modelling and statistical techniques.

The method and model were completed in 2019, and as a result, a statistical production process was set up and consumption based greenhouse gas (GHG) emissions became part of the official statistics produced at Environmental Accounts at Statistics Sweden. Since 2019 these statistics have been published yearly and used as indicators to follow up the Swedish generation goal and the environmental quality objective on reduced climate impact.

The results for the multiple footprints for Swedish consumption between 2014-2018 now provide the most complete picture of Sweden’s global consumption footprint yet available:

**Material footprint**

**Water footprint**

**Land footprint**

**Greenhouse gas footprint**

**Air emission footprints**

**Energy use footprint**

# PRINCE 2

Since 2019, the project team has received renewed funding to conduct a gap analysis in four thematic areas:

**Fisheries**

**Land use change**

**Biodiversity**

**Chemicals**

This analysis will explore the possibilities for regularly estimating footprints for these indicators, along with the potential for more footprint data to be regularly updated and become part of the official statistics.



## **THE PRINCE MODEL**

Most of the PRINCE footprint indicator results are generated using a tailor-made model that tracks flows of commodities through the global economy and estimates the environmental pressures resulting from consumption and production in 44 countries and 5 aggregate “rest of” world regions. The model then allocates those pressures to 59 “product groups” of goods and services consumed in Sweden and to different types of consumption: by the public sector, by private citizens, and in the form of capital investments.

What is novel about the model is that it connects detailed national statistics on consumption in Sweden with global data on production, environmental pressures and supply chains. This enables Sweden to calculate consumption-based footprints of an average Swede for a wide range of environmental pressures and allows us to understand impacts from Sweden’s consumption that occur outside of Sweden’s borders.

## FISHERIES

Whilst consumption-based accounts detailing the environmental impacts or risks associated with terrestrial environments are widespread, impacts on aquatic and marine environments have received limited attention in comparison.

Phase 1 of PRINCE produced a dataset that improved on previous work to integrate more detailed fisheries information into consumption-based accounts. The resulting indicators capture not just direct consumption of fish products, but also embedded pressures – for example, discarded bycatch and fish-based feed fed to animals. There remained, however, a number of limitations to the work conducted in PRINCE 1.

Phase 2 of PRINCE furthers this work and articulates potential next steps for research linked to fisheries impacts (aquaculture and marine). This will include a basic update to the fisheries extension to incorporate aquaculture data from FAO. Initial work to incorporate more powerful catch-methods and discard information for marine fisheries will also take place. A scoping analysis of the potential to extend both capture and aquaculture datasets to improve their ability to incorporate environmental impact assessment (including elements such as stock status and other environmental externalities of production) will also be provided.

## BIODIVERSITY

Given the abounding variety of life on earth the concept of "biodiversity" is hugely complex and multifaceted. To address this complexity in a practical way, consumption-based accounting in the area must make use of credible proxies

Biodiversity was not part of phase 1 of PRINCE but is an area where new possibilities are emerging given data advances. In phase 2 of PRINCE, researchers will summarise the imperative for including biodiversity in a national consumption-based accounting framework – why biodiversity matters and what it adds on top of other more commonly used environmental extensions – and put these in the context of the policy imperatives for Swedish government and the international community.

We will also summarise the state-of-the-art data, highlighting the information that they can provide and tools that are available and showcase some published options for the Swedish context to quantify biodiversity impacts of consumption. These will include a recently developed indicator dashboard, developed by the Sustainable Consumption and Production group in SEI-York in collaboration with the JNCC, an advisor to the UK government.





## CHEMICALS

Chemicals are in the products we buy and consume, in industrial processes, in agricultural production; they are all around us when we live and work. The environmental and health problems arising due to their use are being addressed by a growing number of goals, policies and strategies at multiple levels of government.

To monitor macro-level progress in light of such initiatives, a gap analysis in PRINCE 2 has developed time series for several consumption-based indicators in the area - the use of veterinary medical production (VMP, i.e. antibiotics) and pesticides for food production, and the use of hazardous chemical products.

The analysis has demonstrated the possibility for producing official statistics in these areas. The experimental time series for consumption-based VMPs and pesticides show that the majority of use arises due to Sweden's imports instead of from domestic production. These findings are coherent with the fact that Sweden has amongst the lowest levels of antibiotic and pesticide use in the world.

This is in spite of the fact that economically Sweden's domestic food production is still larger than food imports. Between 2008 and 2019 VMP use due to Swedish consumption has decreased by almost 50 %. Over the same time period, pesticide use has decrease by 12 percent.

A majority of Sweden's consumption-based use of hazardous chemical products also arises due to imported products. Total consumption-based use has further increased between 2008 and 2019 by nearly 60 percent.

## LAND USE CHANGE

The conversion of tropical forests to cropland, pastures and forest plantations results in major losses of carbon sequestration, biodiversity and livelihoods. Until recently there were no comprehensive data linking consumption of agricultural commodities to deforestation and associated environmental impacts.

In PRINCE 1, we constructed a model that quantified the extent to which consumption in Sweden and elsewhere is contributing to tropical deforestation. We found that every year over five million hectares of forest loss across the tropics can be attributed to the expansion of cropland, pastures and forest plantations, and associated commodity production. While a bulk of demand for these commodities is still domestic, carbon emissions from deforestation embodied in international trade are still substantial, amounting to one billion tons of carbon dioxide per year in the period 2010-14.

This model has since been further refined, and we now have data on carbon emissions from tropical deforestation due to Swedish consumption in 2005-2018. Total emissions amount to just under 3 MtCO<sub>2</sub> per year, two thirds of which is due to Swedish food consumption. In particular, palm oil from Southeast Asia and beef from Brazil are contributing to these emissions, and these are also on the rise.

Emissions due to other commodities and regions, on the other hand, have declined in the last years, due to both reduced deforestation in export countries and changing consumption patterns.

