# ESI - A Tool to better capture corporate and investment impacts on the Earth system

***KEY MESSAGES***

*Human activities, like emissions and deforestation, affect many Earth's landcover, waterflow, and temperature - three important planetary boundaries. These changes ripple through the Earth system because of interactions between the individual Earth system processes.*

*Mitigating severe systemic risks related to climate change and nature depletion hinges on our ability to ensure we rapidly reduce the harm being done to our natural carbon sinks.*

*ESI is a tool that can allow investors to assess the planetary scale impact of an individual company or asset, and aggregate it to portfolio level. It is systemic, context sensitive and science based and can be valuable for guiding improved decision-making.*

***AUTHORS***

**Beatrice Crona**
Global Economic Dynamics and the Biosphere (KVA),
and Stockholm Resilience Center

**Giorgio Parlato**
Global Economic Dynamics and the Biosphere (KVA)

**Steve Lade**
Stockholm Resilience Center and Australian National University

**Ingo Fetzer**
Stockholm Resilience Center

**Victor Maus**
University of Economics and Business in Vienna

*This brief is based on a scientific paper published in Social Science Research Network (SSRN) 2023 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4037299*

GLOBAL ECONOMIC DYNAMICS AND THE BIOSPHERE
THE ROYAL SWEDISH ACADEMY OF SCIENCES

*To truly understand and mitigate the environmental impact of corporate activities, it is essential to look beyond carbon emissions alone. The Earth System Impact (ESI) score offers a comprehensive approach, capturing a broader set of environmental dimensions and emphasizing the importance of geo-specific impacts. This brief outlines the prototype ESI tool and its potential applications for companies and investors.*

## Introduction

The rapid increase in sustainable finance underscores the urgency of more robust Environmental, Social, and Governance (ESG) metrics. While the ambition of many investors is commendable, there is a discernible gap in current ESG metrics' capacity to capture the full environmental impact. Unless remedied, this could misalign investments for climate impact, and create growing blind spots for both climate and broader systemic risks arising from interactions between climate and nature.

The Earth System Impact (ESI) score is developed by Earth system scientists to offer a more nuanced understanding of environmental impacts, that accounts for key planetary boundaries and their interactions. Oceans and forests absorb about 50% of human-caused carbon emissions. Without the biosphere's carbon absorption, we would already have passed beyond 1.5 degrees. Accounting for corporate land and water use will increase environmental impact assessment accuracy, and ensure it better matches stated intentions by investors.

## Existing frameworks- CDP, GRI, SBTN, and TNFD

Existing initiatives like CDP, GRI, SBTN, and TNFD aim to guide companies in assessing their environmental impact. While SBTN and TNFD offer guidance on setting operational priorities, CDP and GRI focus on reporting emissions and other variables, such as land use and water.

Capturing the interactions between multiple environmental factors is key to understanding climate change - as well as how to mitigate it. Such a systems perspective is however not yet part of established frameworks and guides. ESI offers a way to include critical interactions of the Earth System in the analysis.

## Contributions to total Earth system impact vary across localities

Environmental impacts vary based on where on the planet an asset is located. For example, a mining operation in a region with abundant water will have a different environmental footprint than one in a water-scarce area. Similarly, in the North American great plains water extraction has a more significant environmental impact compared to the Amazon rainforest. By accounting for interactions between three planetary boundaries (climate, water and landuse), as well as their scientifically estimated boundaries and regional availability, ESI gives an improved assessment of impact compared to just simple measures of GHG emissions, water withdrawal and landuse.

## Using the ESI approach to inform sustainability decisions

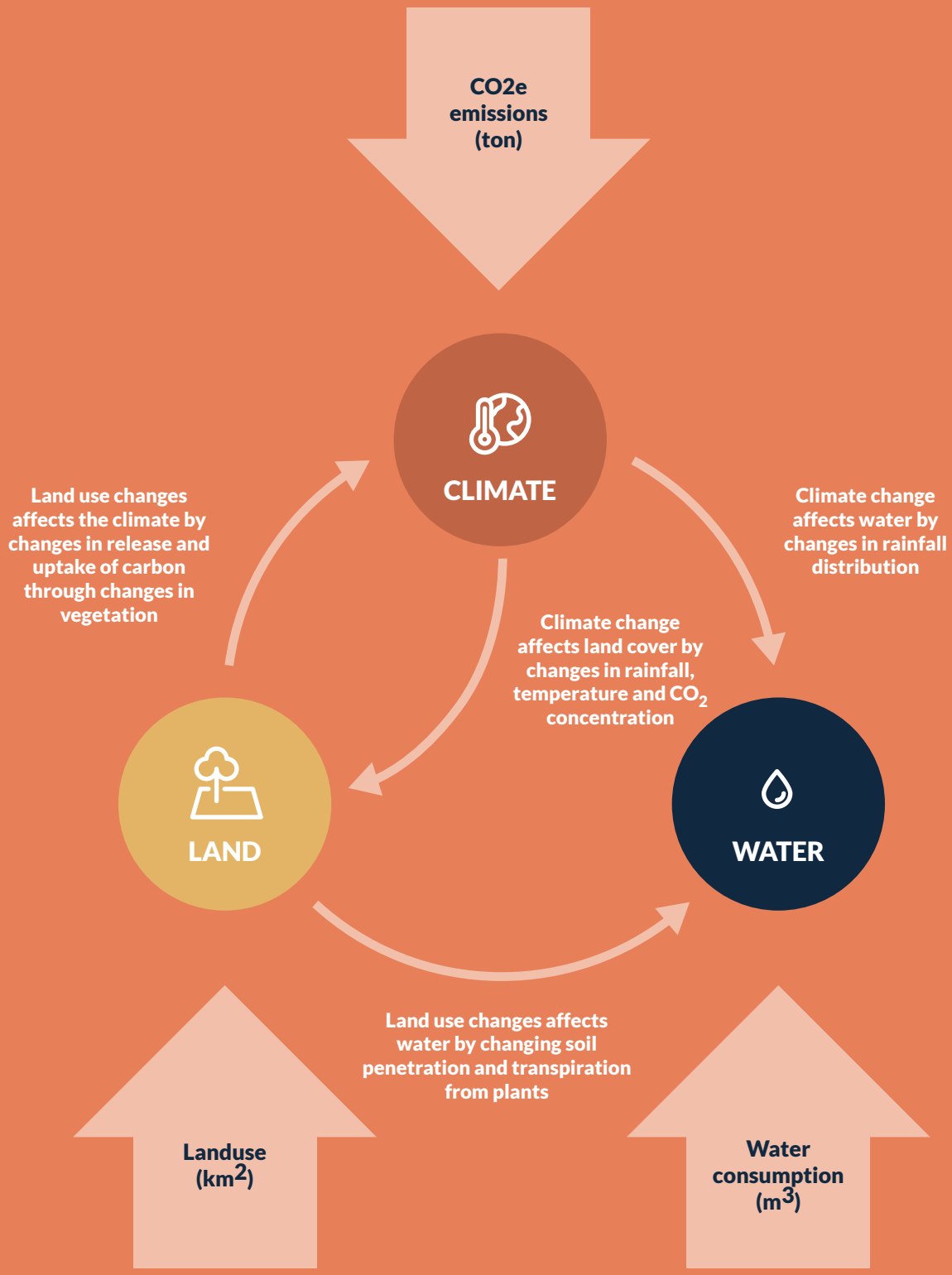
For investors committed to genuine sustainability, the ESI score offers a simple-to-use, yet nuanced tool to measure environmental impact at the global scale. ESI is systemic, context sensitive and science based. Adopting the ESI Score into environmental assessments will therefore give a more holistic view of a company or a portfolio's impact.

By focusing on just three corporate asset-level disclosures - water consumption, landuse, and GHG emissions, investors aiming to reduce their environmental impact can determine which Earth system domains are most affected by a particular asset, and thereby significantly improve impact assessment of their operations or portfolios. Pension funds, insurance companies and other large asset owners have a vested interest in mitigating systemic risks. The ESI score could provide a way to identify high-impact companies in their portfolios, if company asset level disclosures became available across all holdings. In the meantime, the ESI can be used to improve targeted engagement by providing information on where corporate environmental impact mitigation strategies can have the most effect on the Earth system.

## Current status of the ESI score

The score is currently in prototype stage. Work is underway to further develop the scientific basis of the score and to test its use. Get in touch if you'd like to test it out!

**Figure 1. Earth system interactions asessed by the ESI prototype score.**
**Big arrows represent the anthropogenic pressures that impact Climate, Land and Water. Small arrows represent the interactions between Earth system components.**



**Try the tool here!**

## *References*


***Going beyond carbon: An "Earth System Impact" score to better capture corporate and investment impacts on the Earth system***, Social Science Research Network 2023

***A prototype Earth system impact metric that accounts for cross-scale interactions***, Environmental Research Letters 2021



***Beatrice Crona***

*Beatrice is Professor of Sustainability and Deputy Science Director at the Stockholm Resilience Center (Stockholm University) and the Executive Director of the research program Global Economic Dynamics and the Biosphere at the Royal Swedish Academy of Science. Her background is in sustainability science and systems ecology. The last five years she has worked on identifying opportunities for financial leadership for climate stability and sustainable development by linking Earth system science to corporate ownership, investment patterns and impact assessment.*