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Spatial sustainable finance

Tracking biodiversity and water risks

Alexander Damm-Reiser, Patrick Laube

Photo by Pixabay

Iron ore mining site, Austria

Biodiversity loss, set to be one of the largest environmental crises of all times, will collapse economies and societies. If the financial sector wants to survive it must move now, fast and at scale.

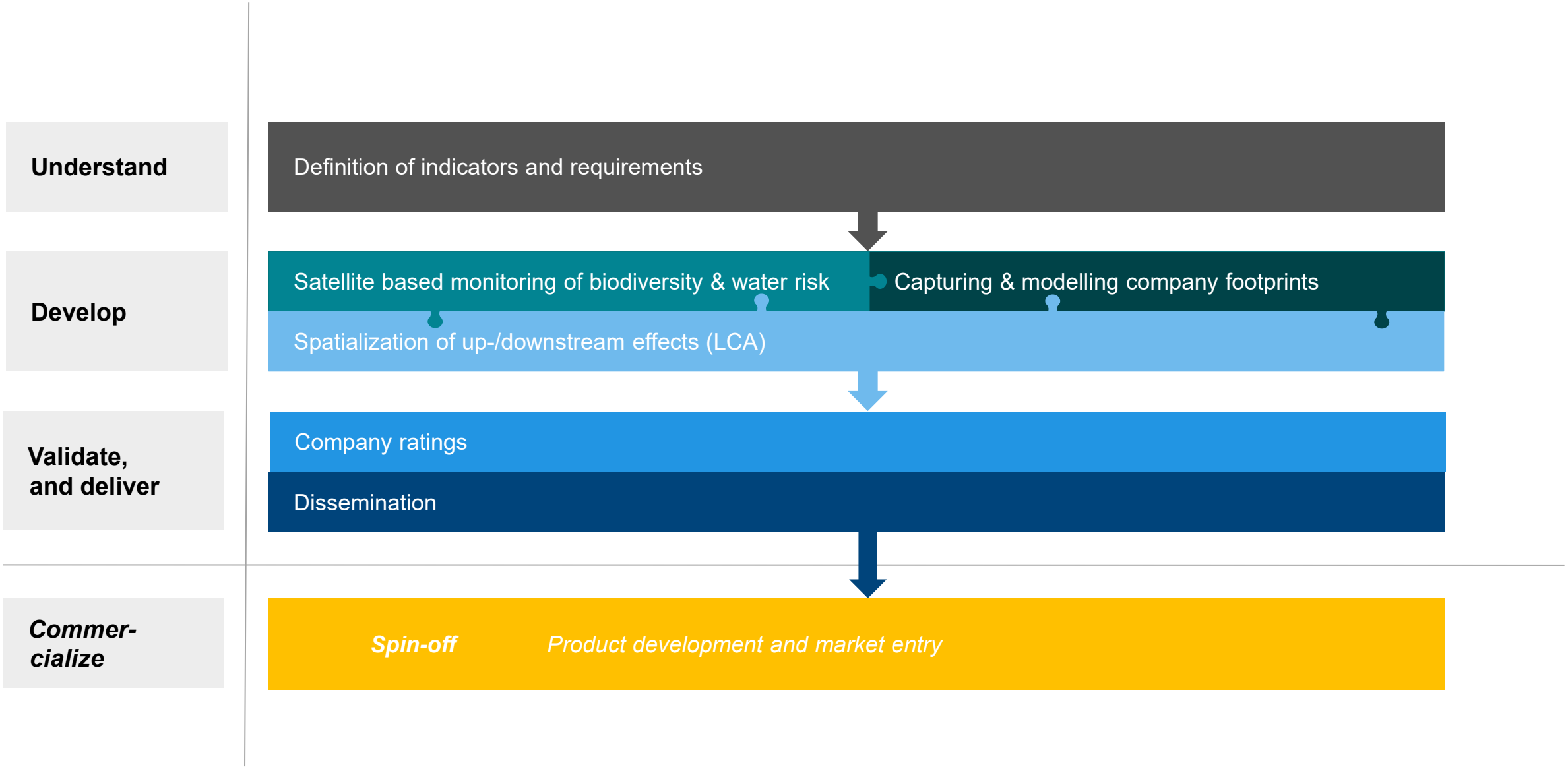
Diane-Laure Arjalies, FT, 13.09.2021

We want to set a global rating standard that enables financial institutions and companies to reduce their biodiversity footprint.

Photo by Sebastian Pichler on Unsplash

Iron ore mining site, Austria

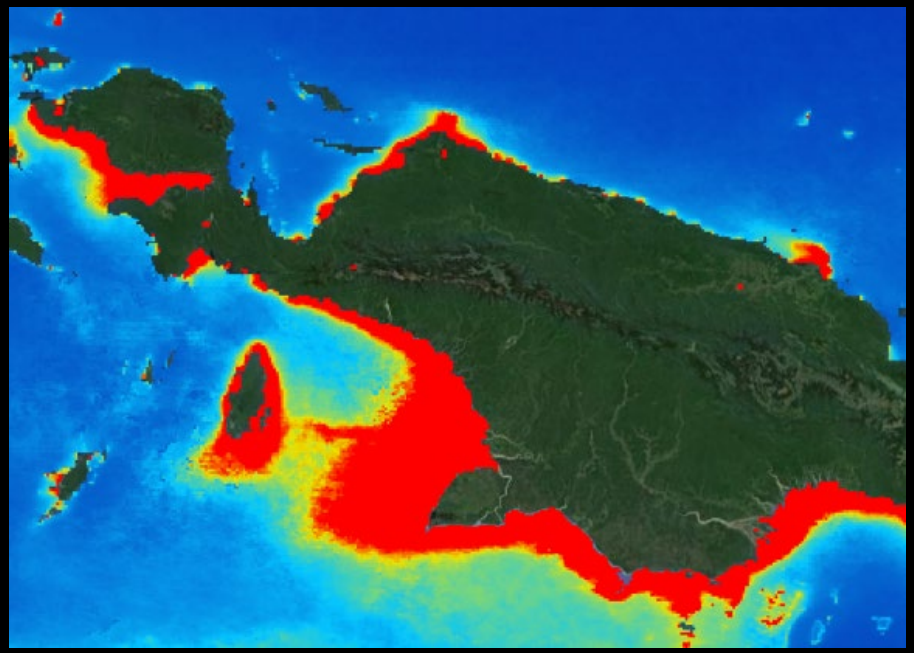
Our approach



Local environmental impact
Satellite Remote Sensing

Photo by Pixabay

Essential biodiversity variables



Essential water variables

Left: Landsat 5, 7 and 8 Collection 1 Tier 1, 8-Day EVI Composite courtesy of the U.S: Geological Survey

Right: NASA Goddard Space Flight Center, Ocean Ecology Laboratory, Ocean Biology Processing Group. Moderate-resolution Imaging Spectroradiometer (MODIS) Aqua Ocean Color Data, NASA OB.DAAC, Greenbelt, MD, USA, https://doi.org/10.5067/TERRA/MODIS/L3M/CHL/2018

All data were assessed via the Earth Engine: Gorelick, N., Hancher, M., Dixon, M., Ilyushchenko, S., Thau, D., & Moore, R. (2017). Google Earth Engine: Planetary-scale geospatial analysis for everyone. Remote Sensing of Environment, 202, 18-27, https://doi.org/10.1016/j.rse.2017.06.031.

Local environmental impact
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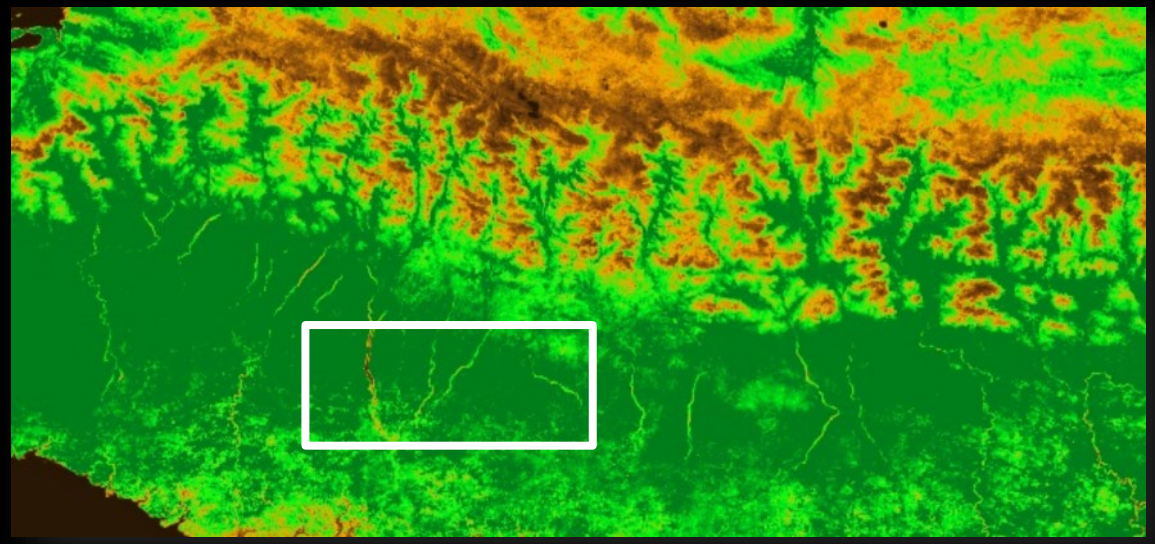
Photo by Pixabay



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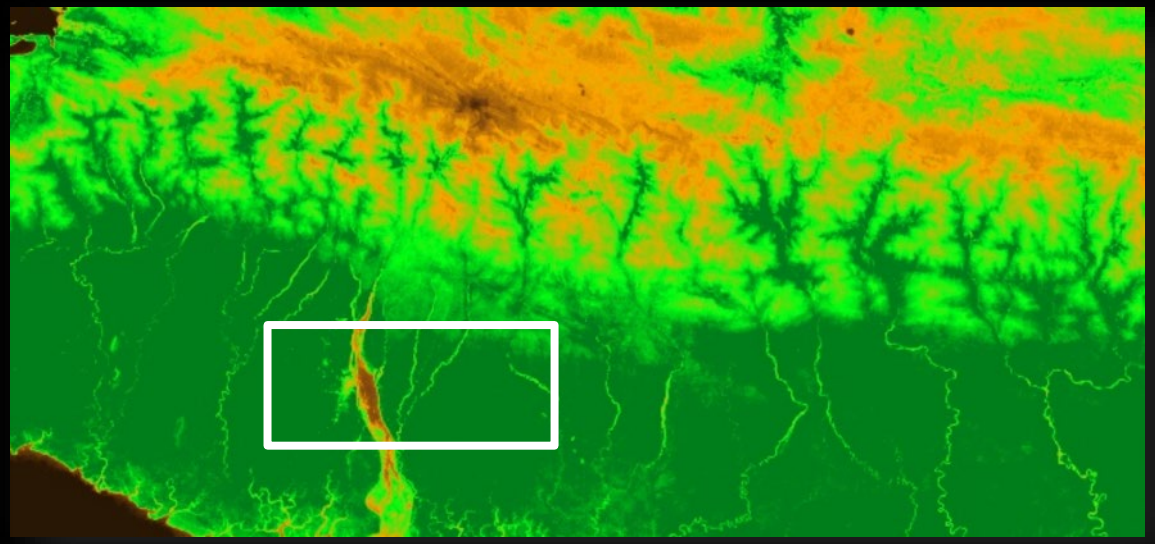

2016

Landsat 5, 7 and 8 Collection 1 Tier 1, 8-Day EVI Composite courtesy of the U.S: Geological Survey

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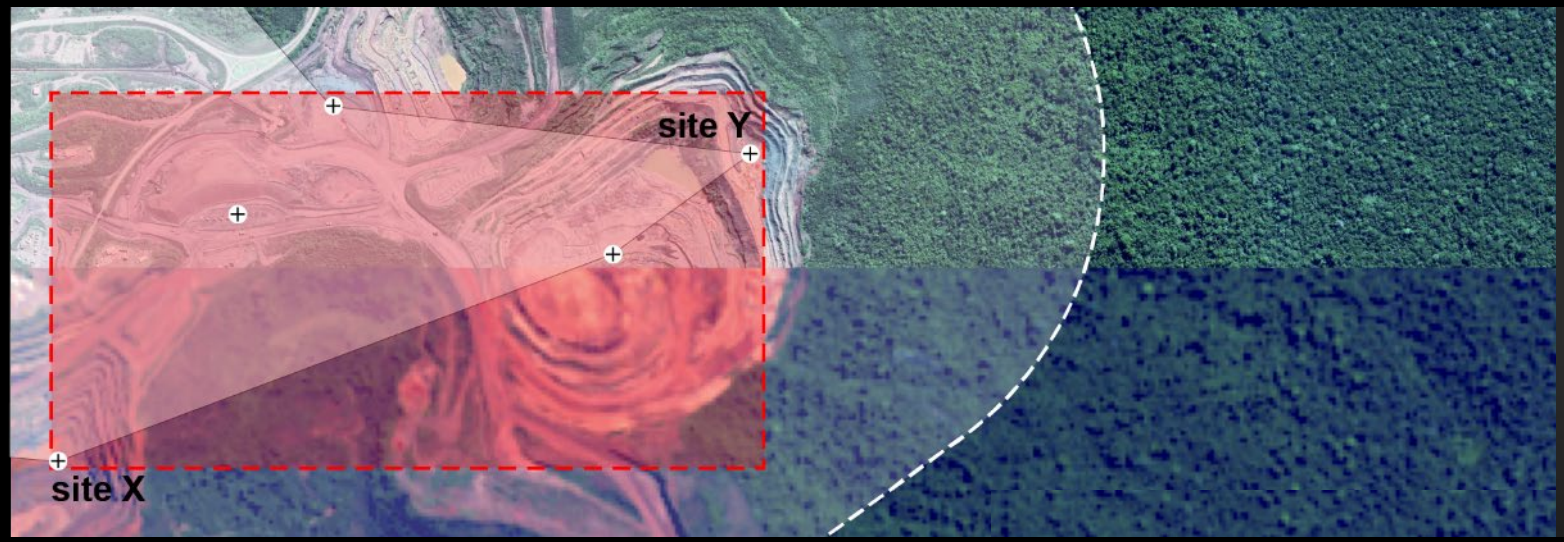
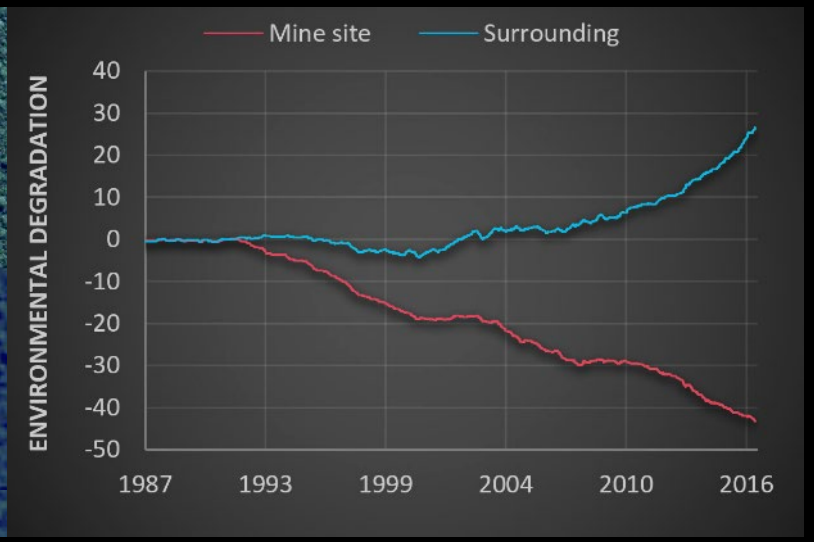


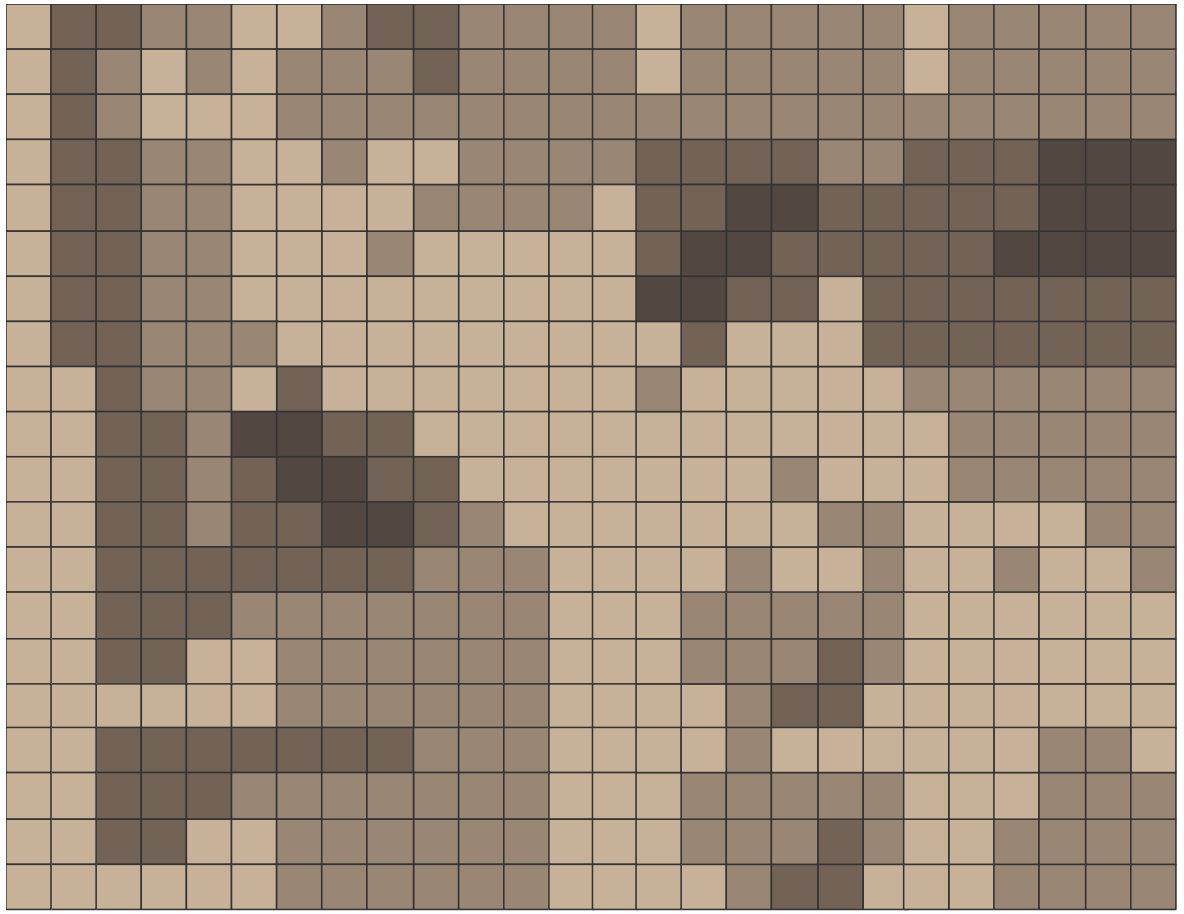


Left: Image source: icons by flaticon.com, image data by Google 2020 & Copernicus

Right: Analysis based on Landsat 5, 7 and 8 Collection 1 Tier 1, 8-Day EVI Composite; Courtesy of the U.S: Geological Survey; The data were assessed via the Earth Engine: Gorelick, N., Hancher, M., Dixon, M., Ilyushchenko, S., Thau, D., & Moore, R. (2017). Google Earth Engine: Planetary-scale geospatial analysis for everyone. Remote Sensing of Environment, 202, 18-27, https://doi.org/10.1016/j.rse.2017.06.031.

Spatial integration of risk data and asset level

Satellite based monitoring of biodiversity & water risk



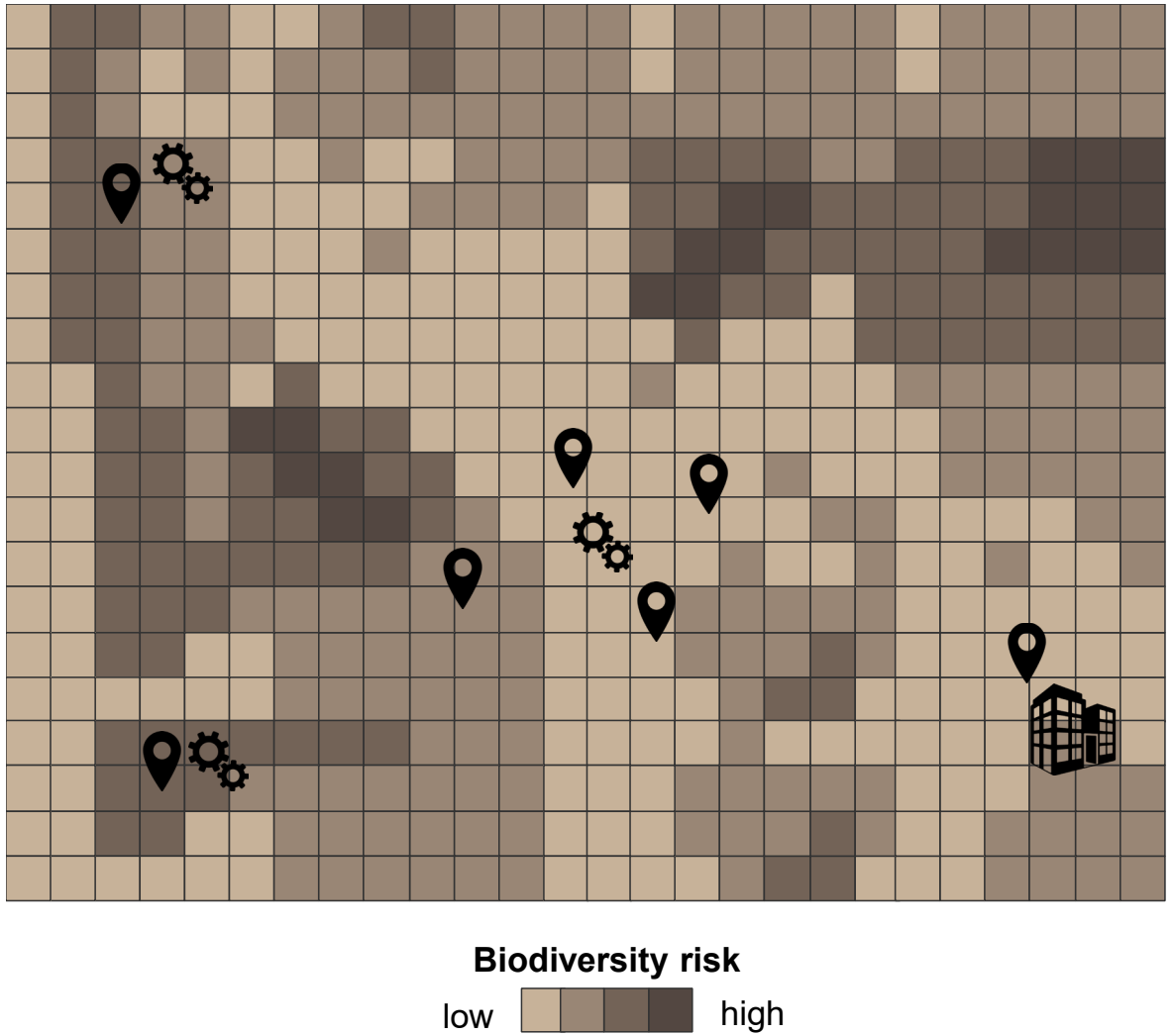
Biodiversity risk

low high

Spatial integration of risk data and asset level

Satellite based monitoring of biodiversity & water risk

Capturing asset level data



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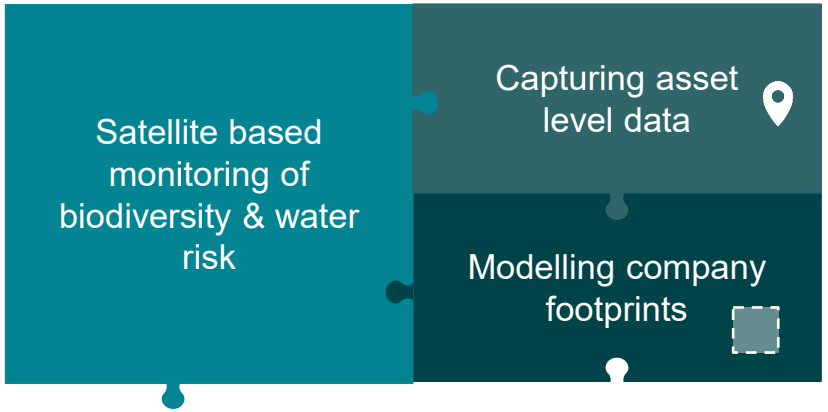

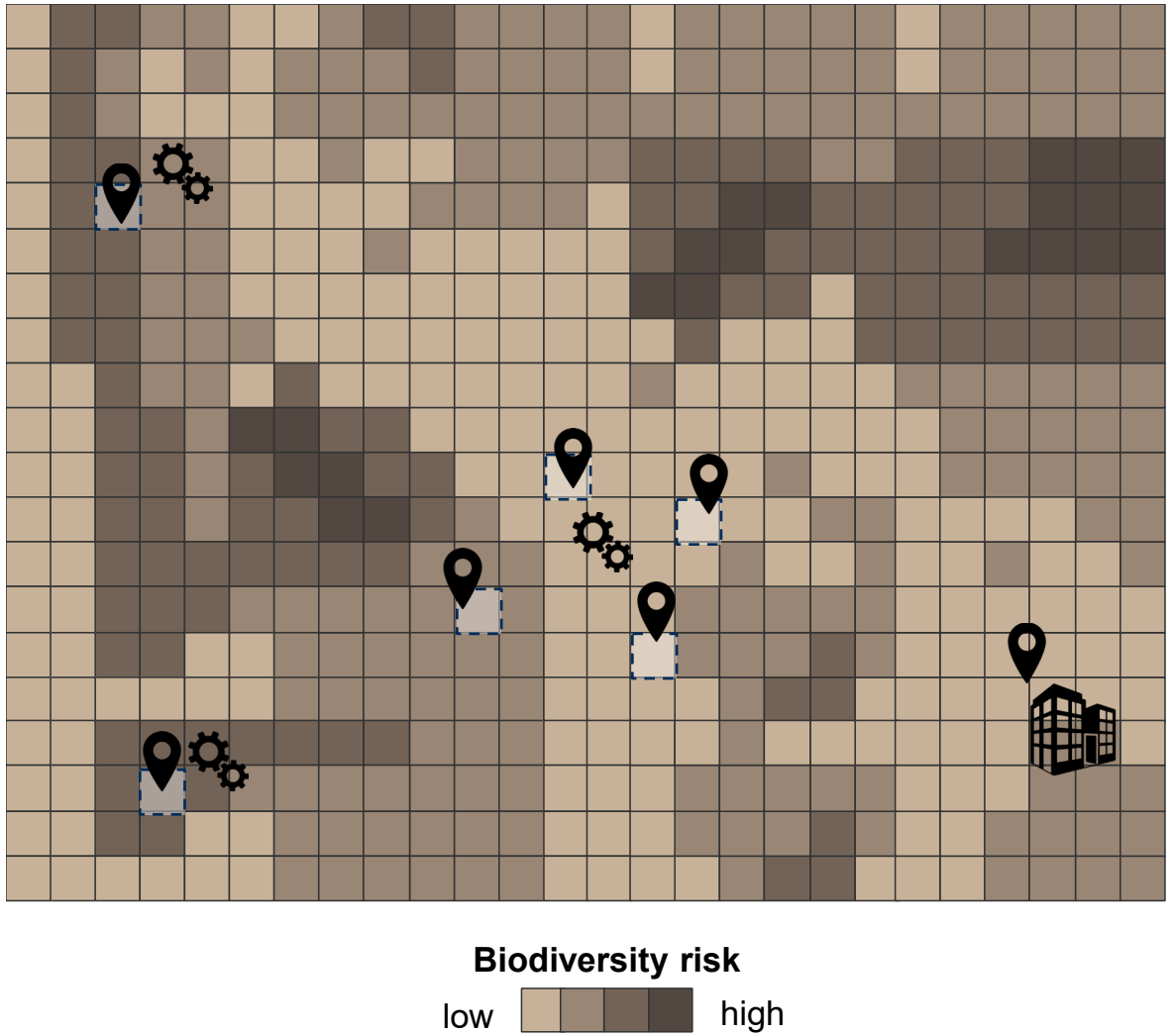

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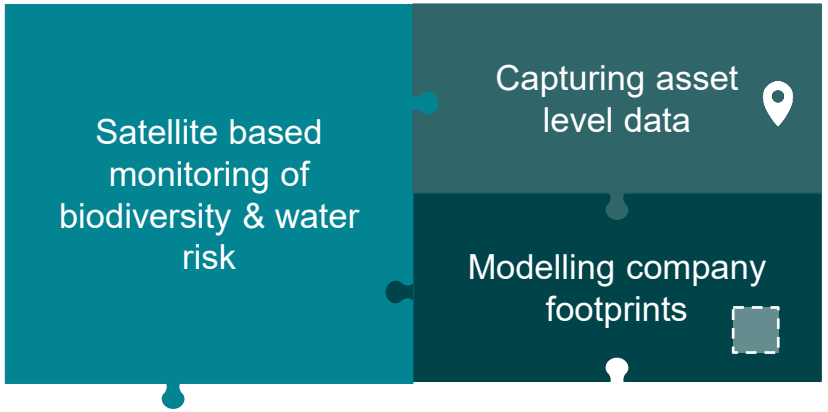

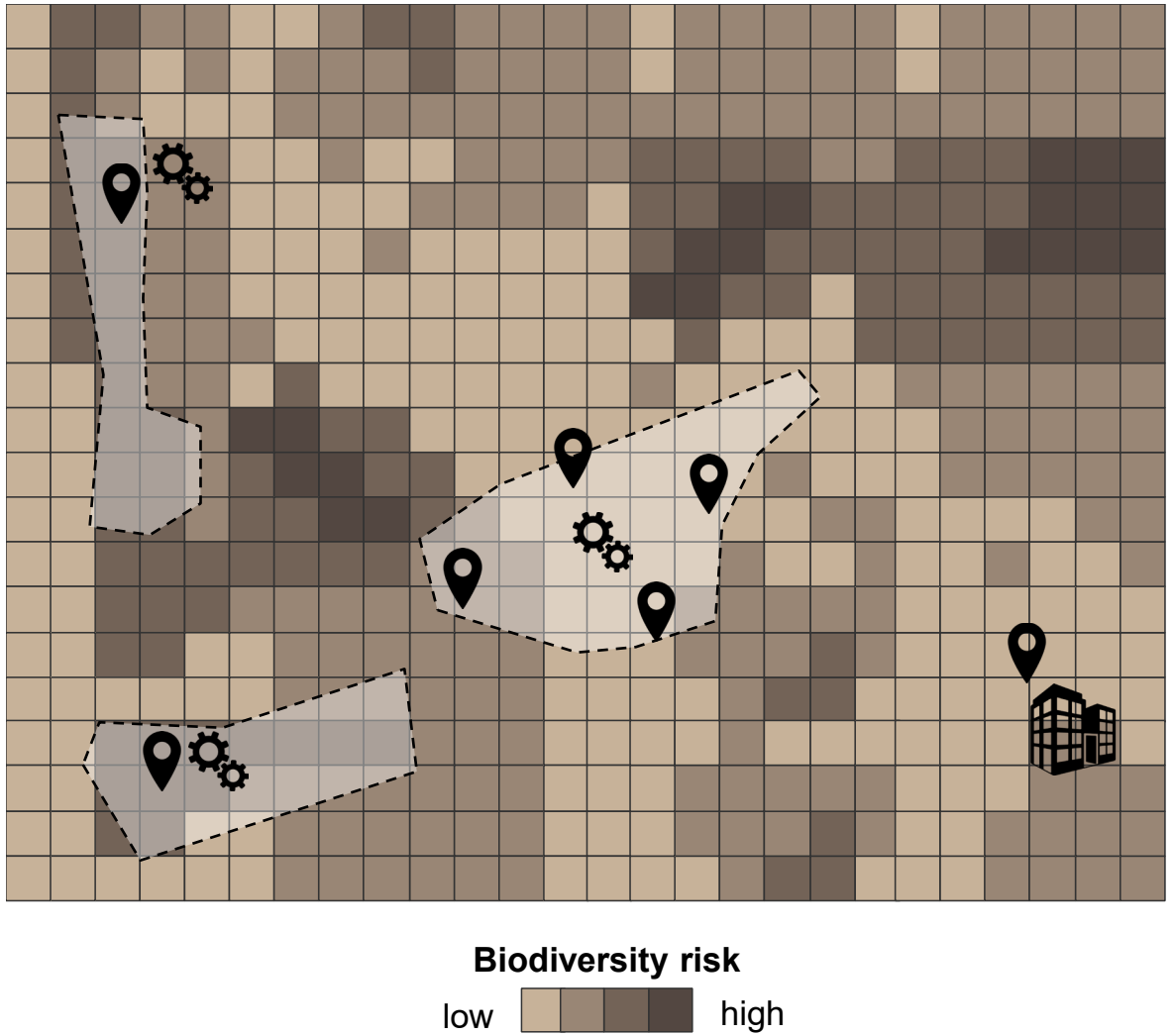

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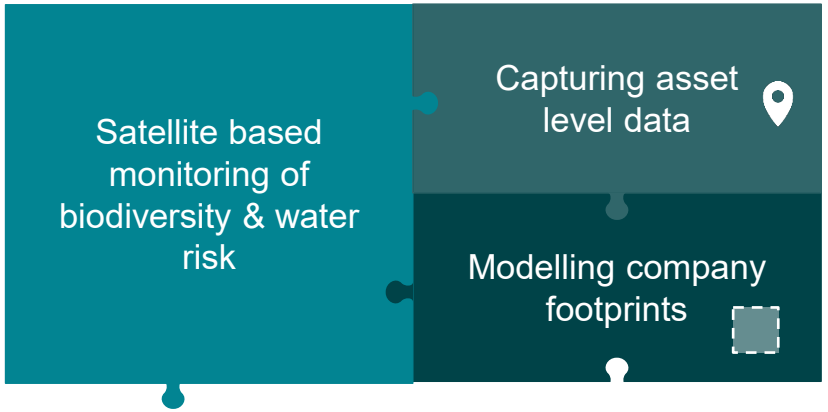

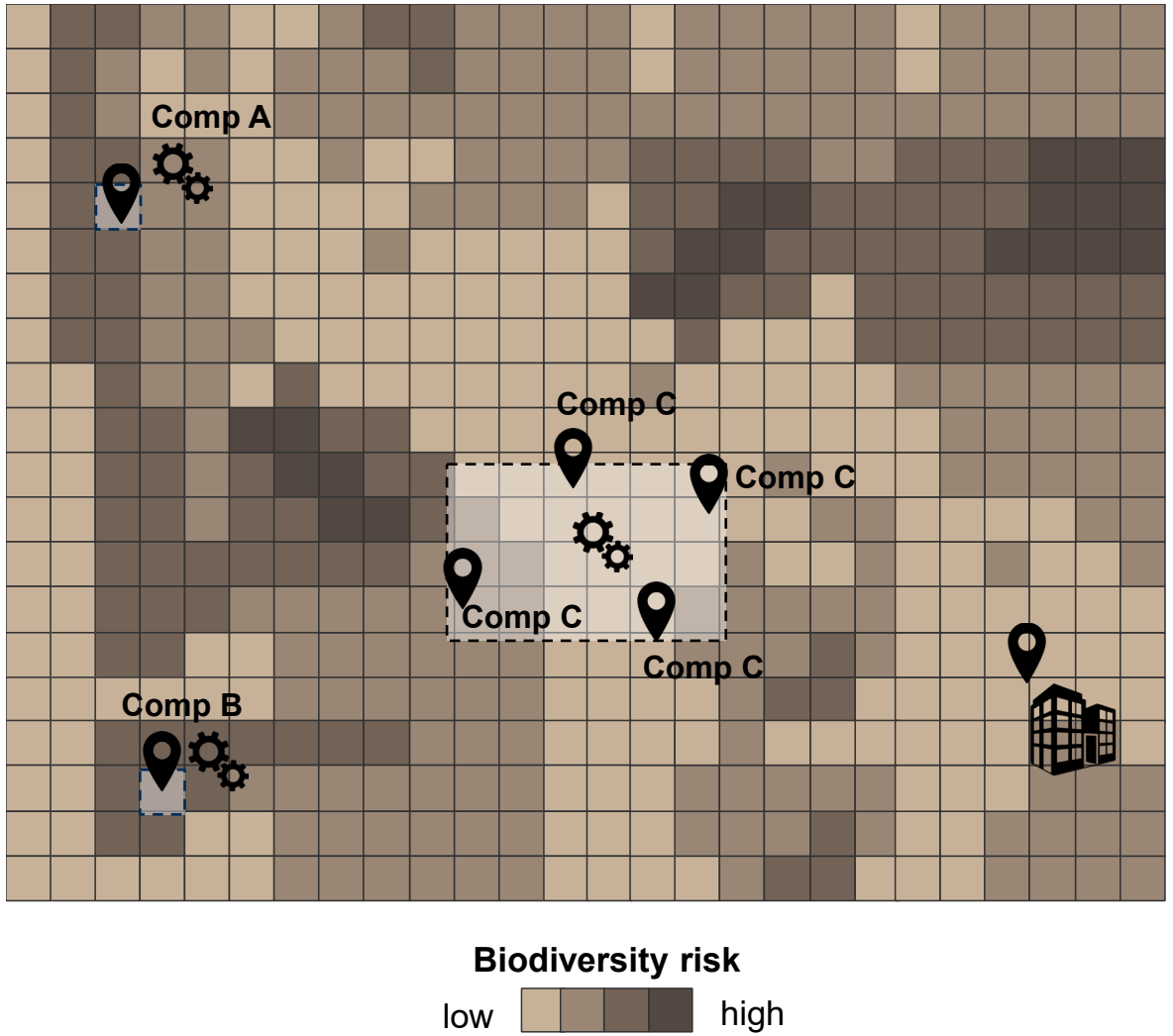

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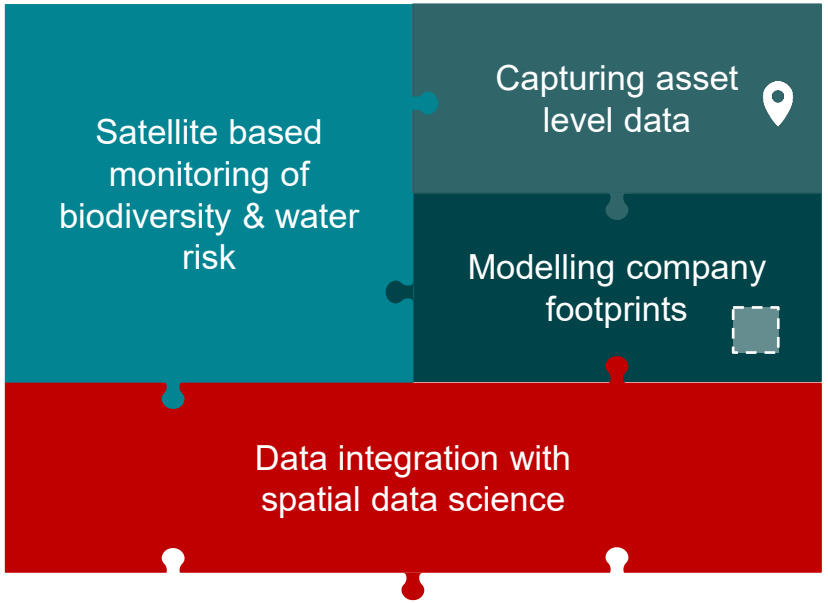

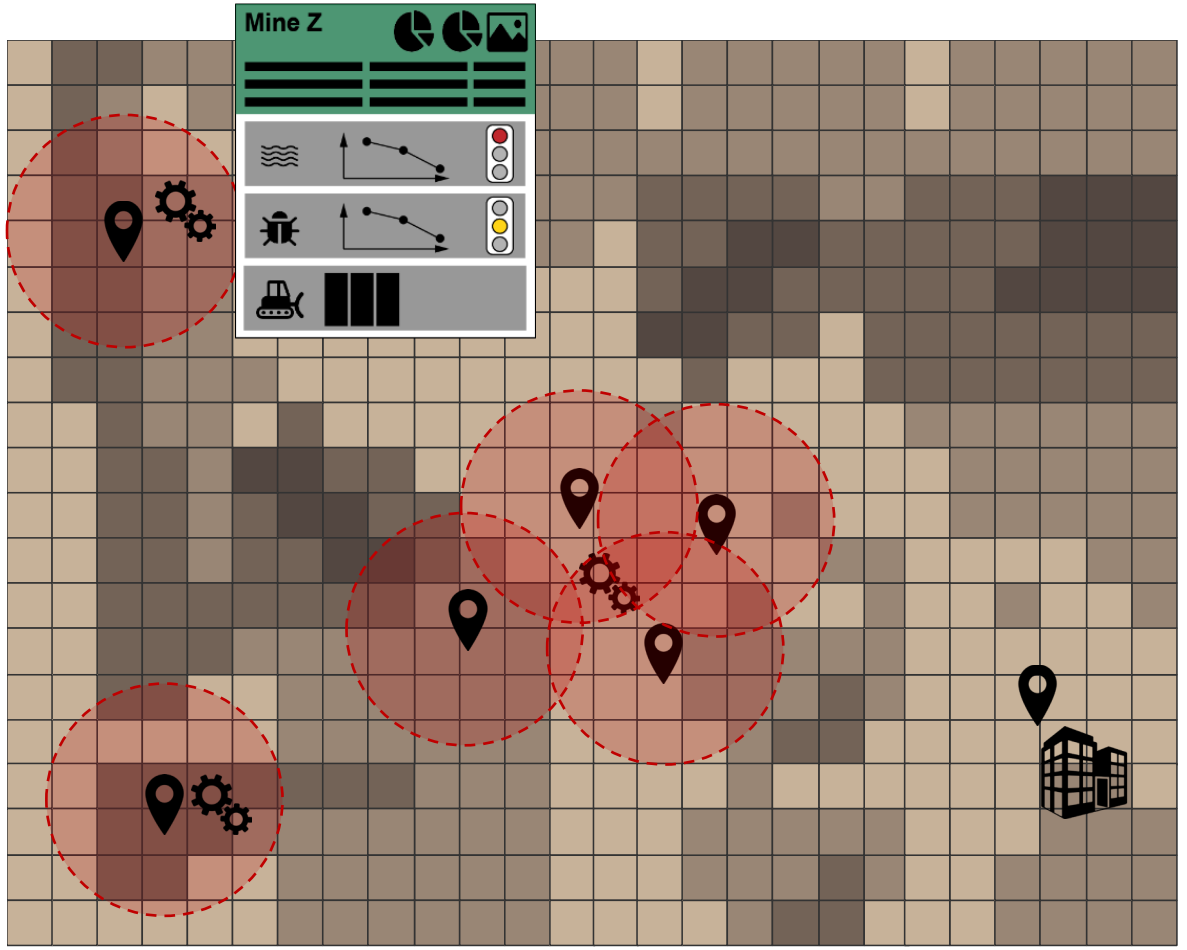

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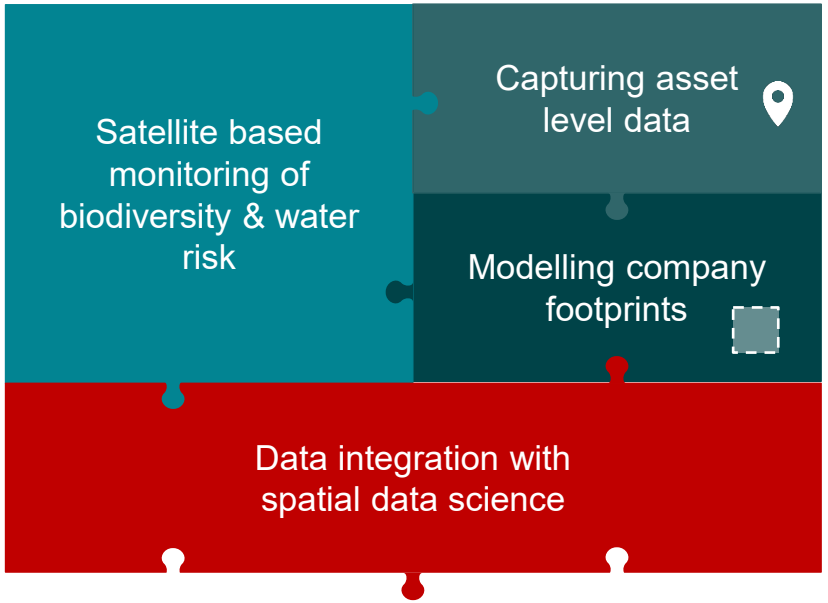

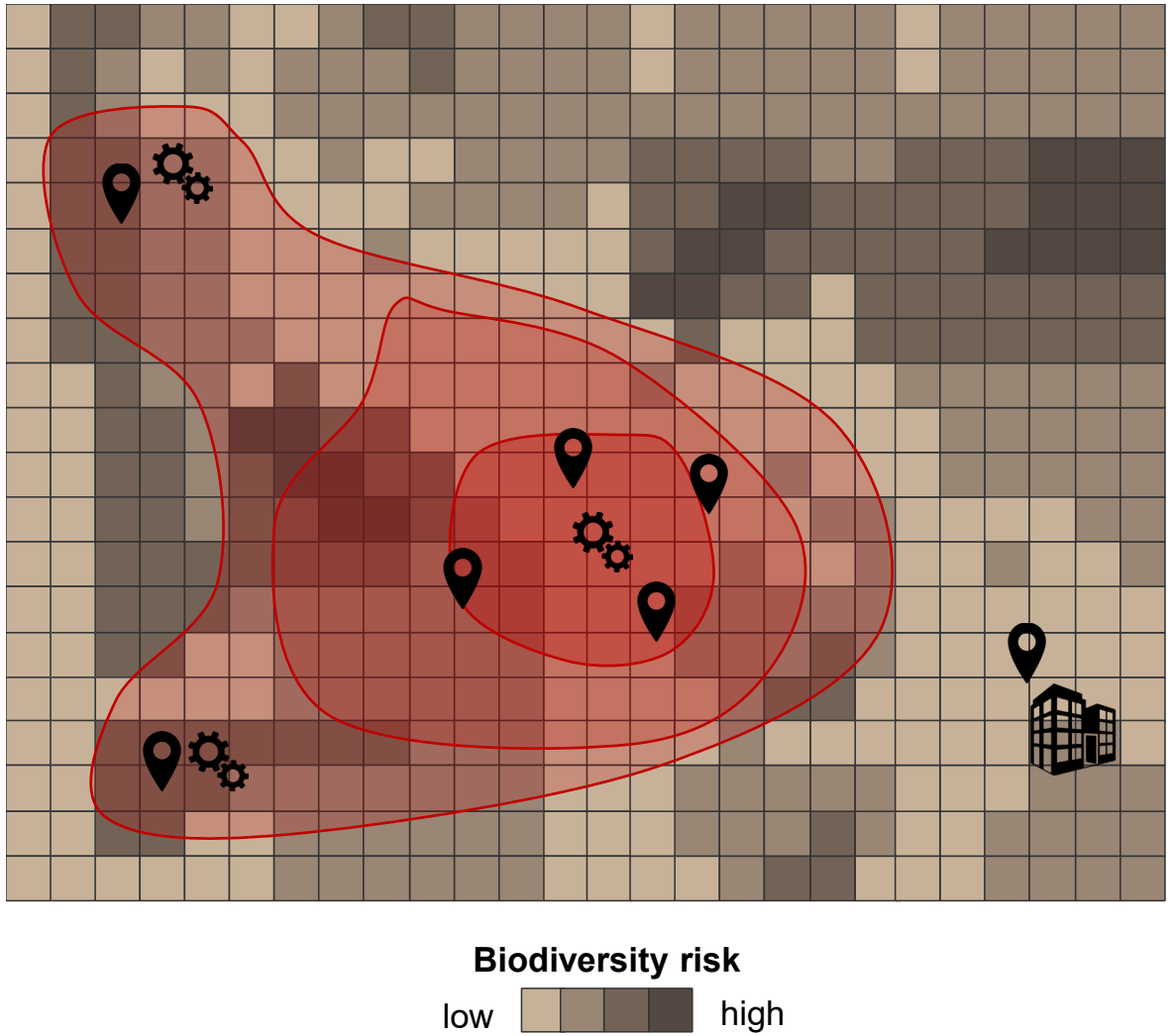

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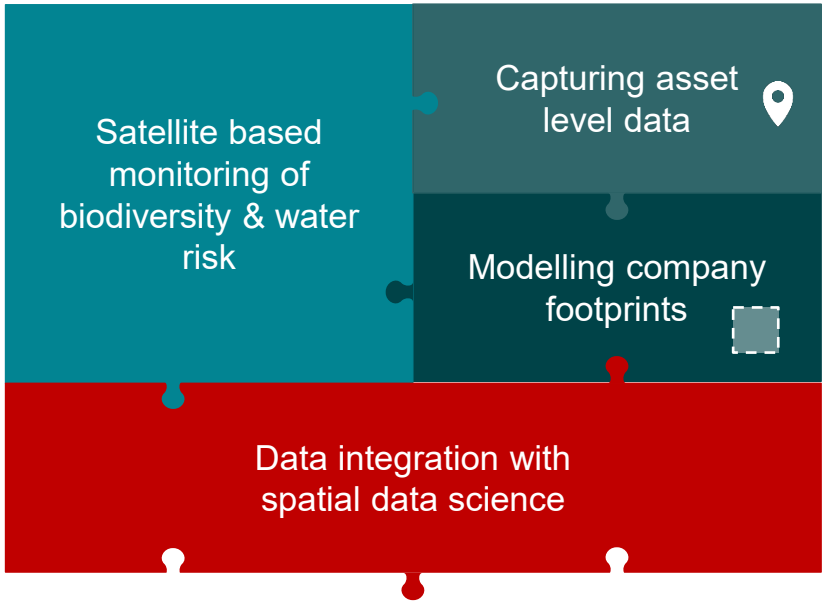

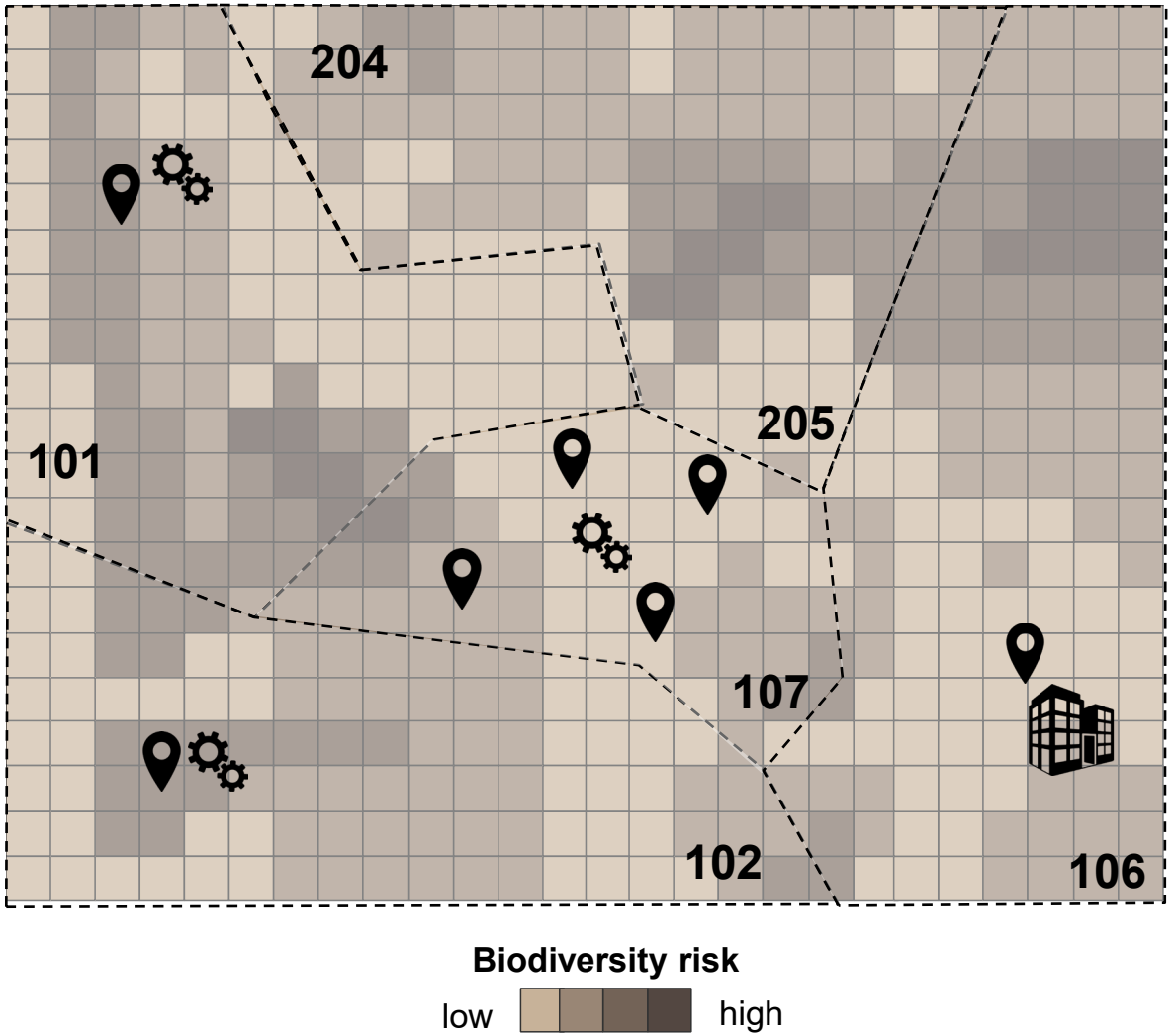

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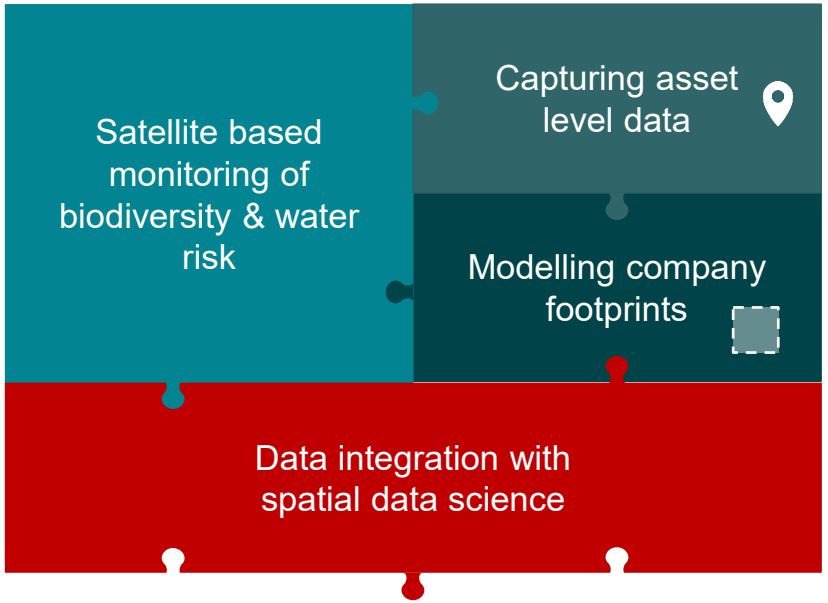
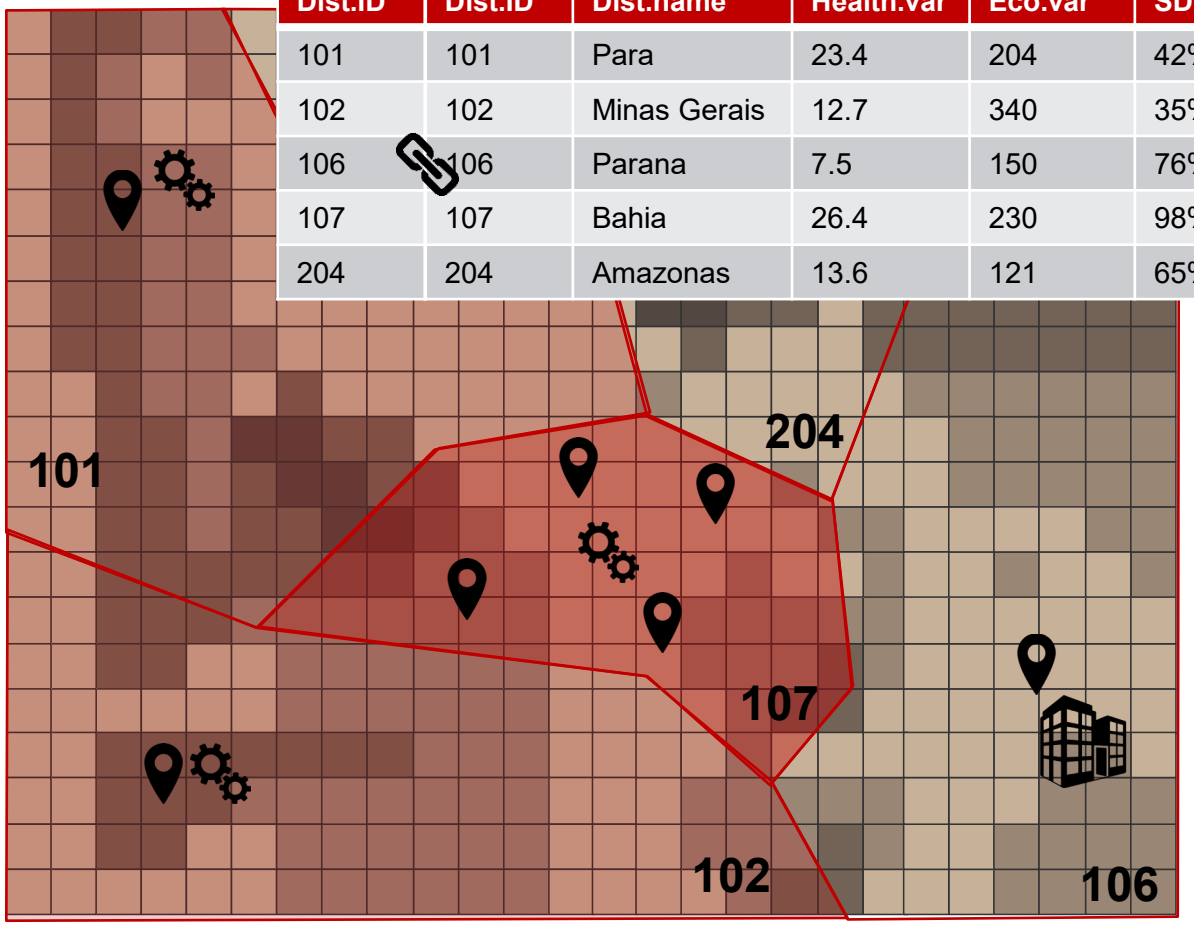
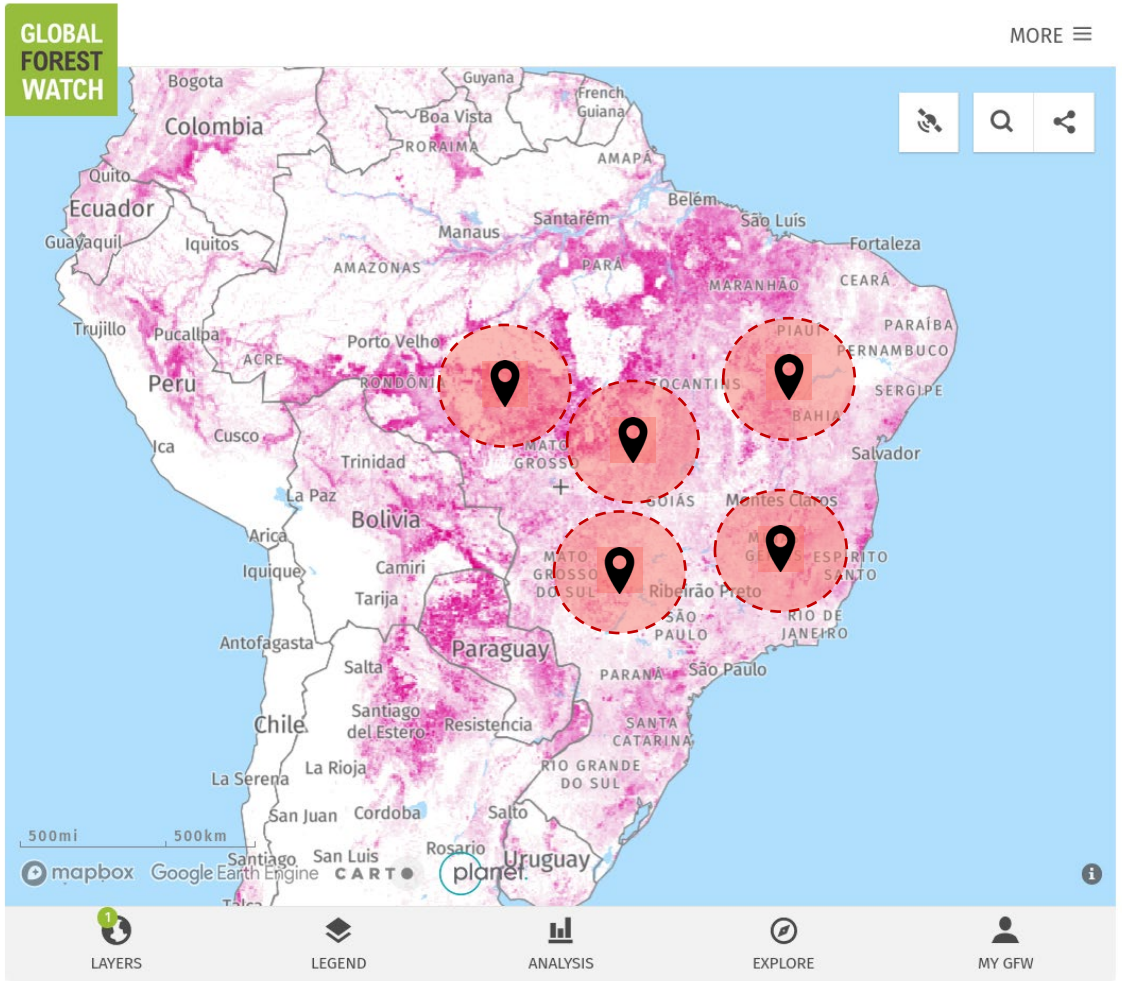
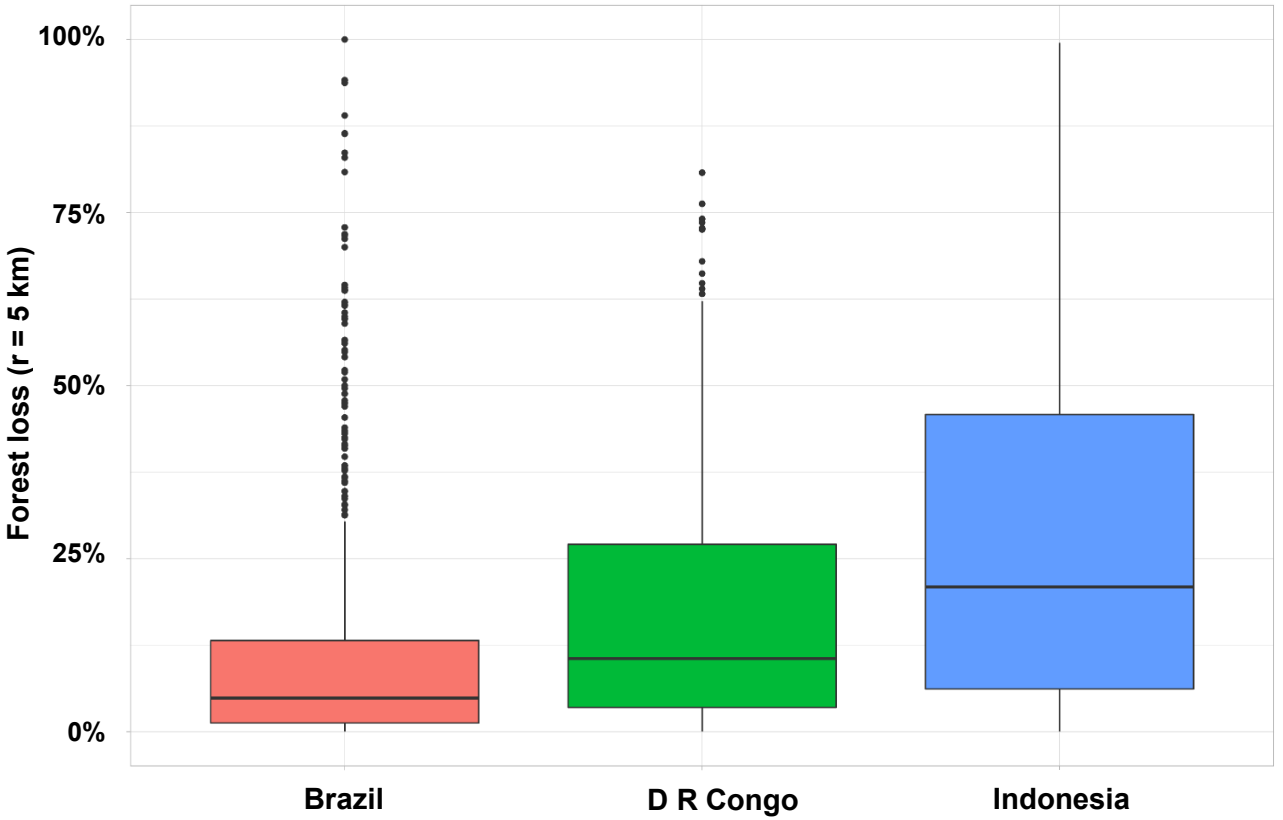


Dist.ID	Dist.ID	Dist.name	Health.var	Eco.var	SDG3
101	101	Para	23.4	204	42%
102	102	Minas Gerais	12.7	340	35%
106	106	Parana	7.5	150	76%
107	107	Bahia	26.4	230	98%
204	204	Amazonas	13.6	121	65%



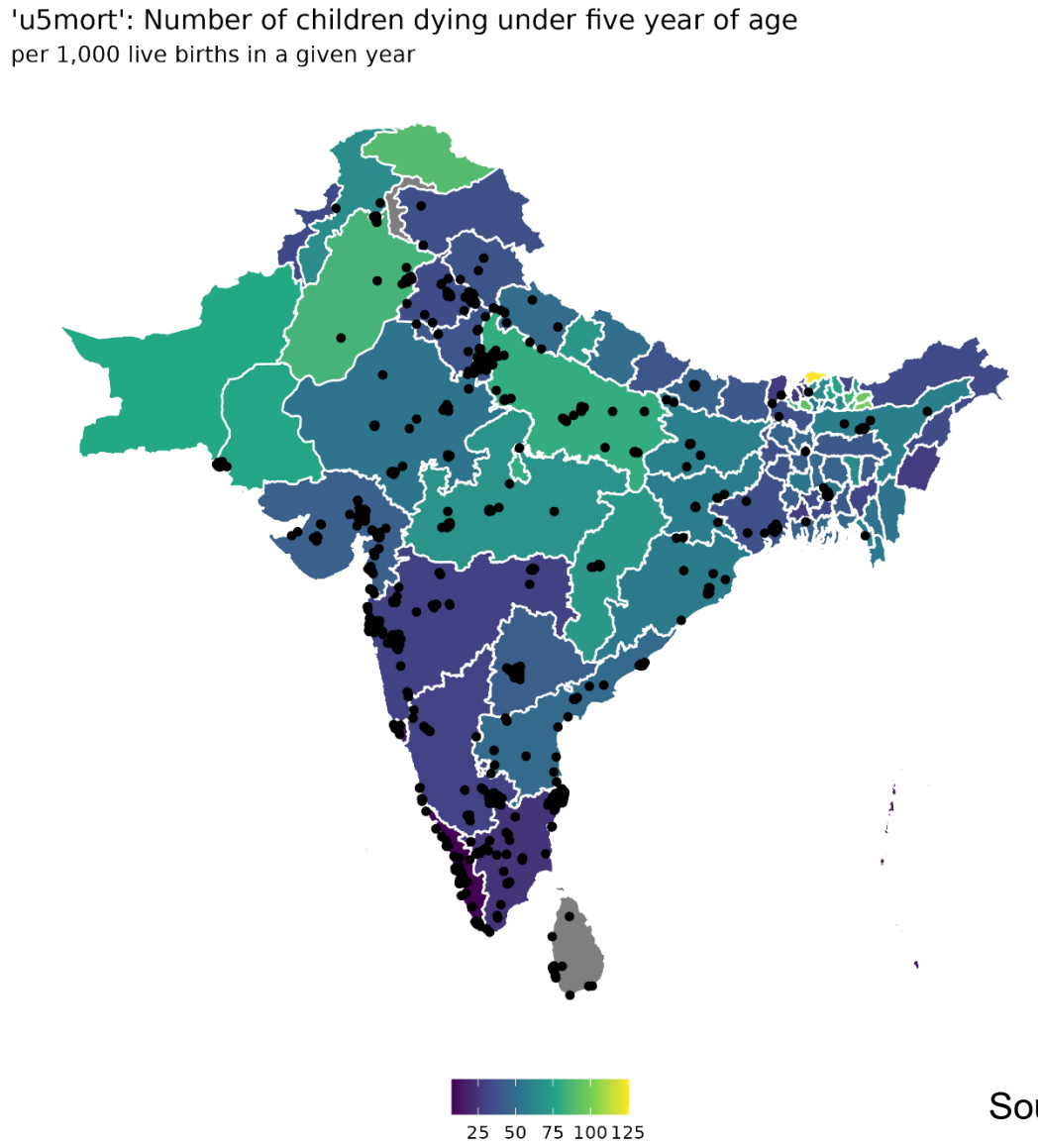
Example 1: Deforestation around mines in Brazil





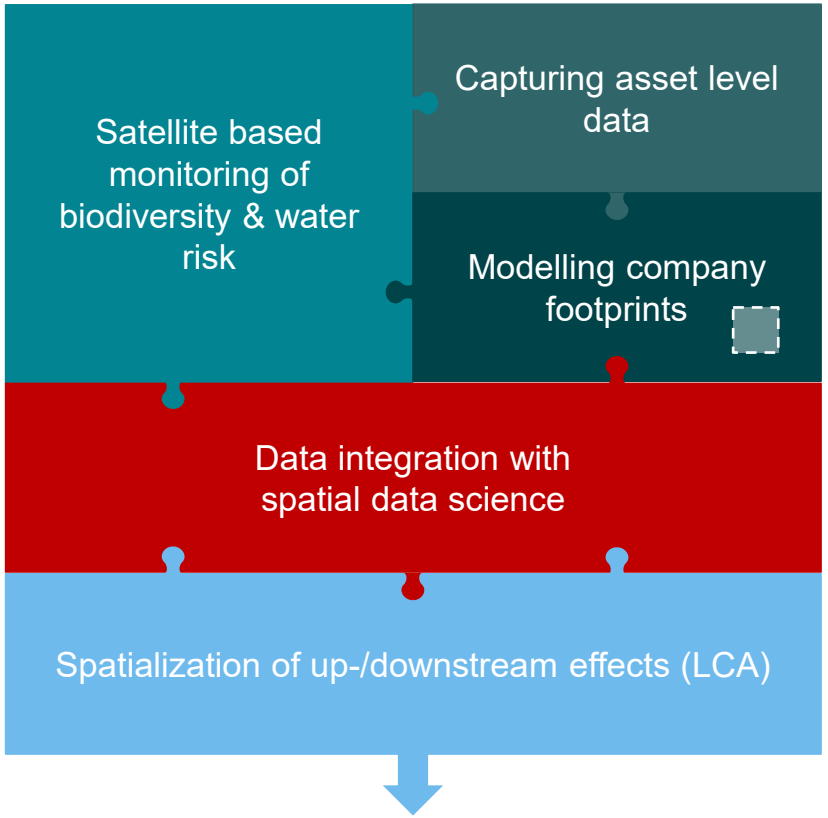
Sources: https://www.globalforestwatch.org/map/, S&P CapIQ Metals and Mining, Maus, V., Giljum, S., Gutschlhofer, J., da Silva, D. M., Probst, M., Gass, S. L. B., Luckeneder, S., Lieber, M., McCallum, I., 2020. A global-scale data set of mining areas. Scientific Data, 7(1), 289. https://doi.org/10.1038/s41597-020-00624-w

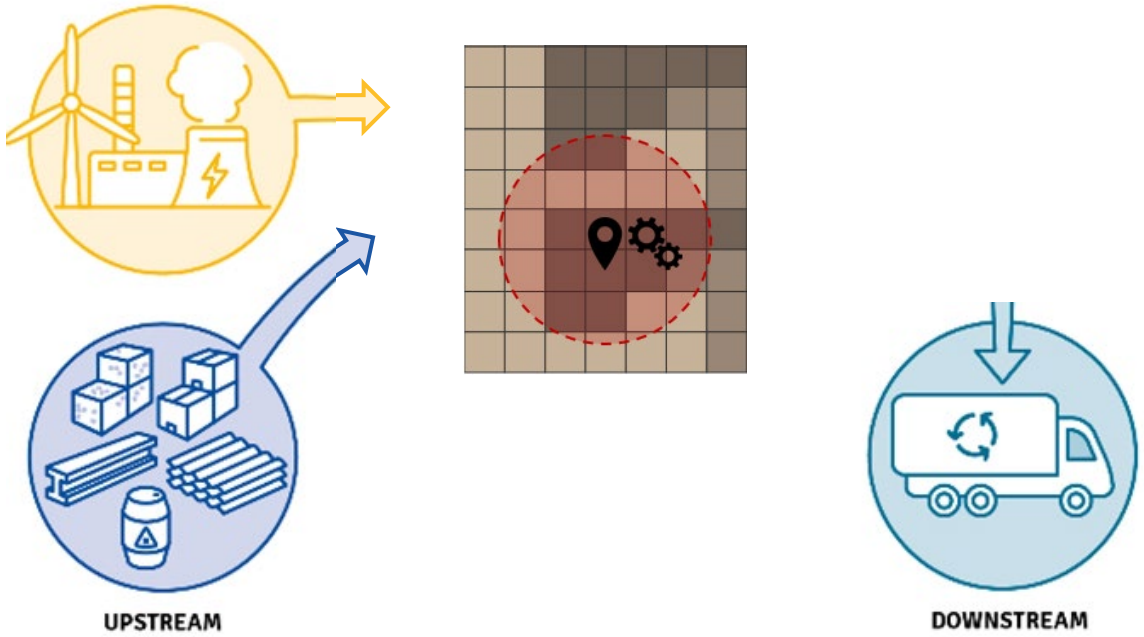
Example 2: SDG 3, health, administrative units



Source ‘u5mort’: https://globaldatalab.org/

Spatial integration of risk data and asset level





Indirect impacts: Scope framework for impacts along the value chain

Remote Sensing

Life Cycle based

Scope 1

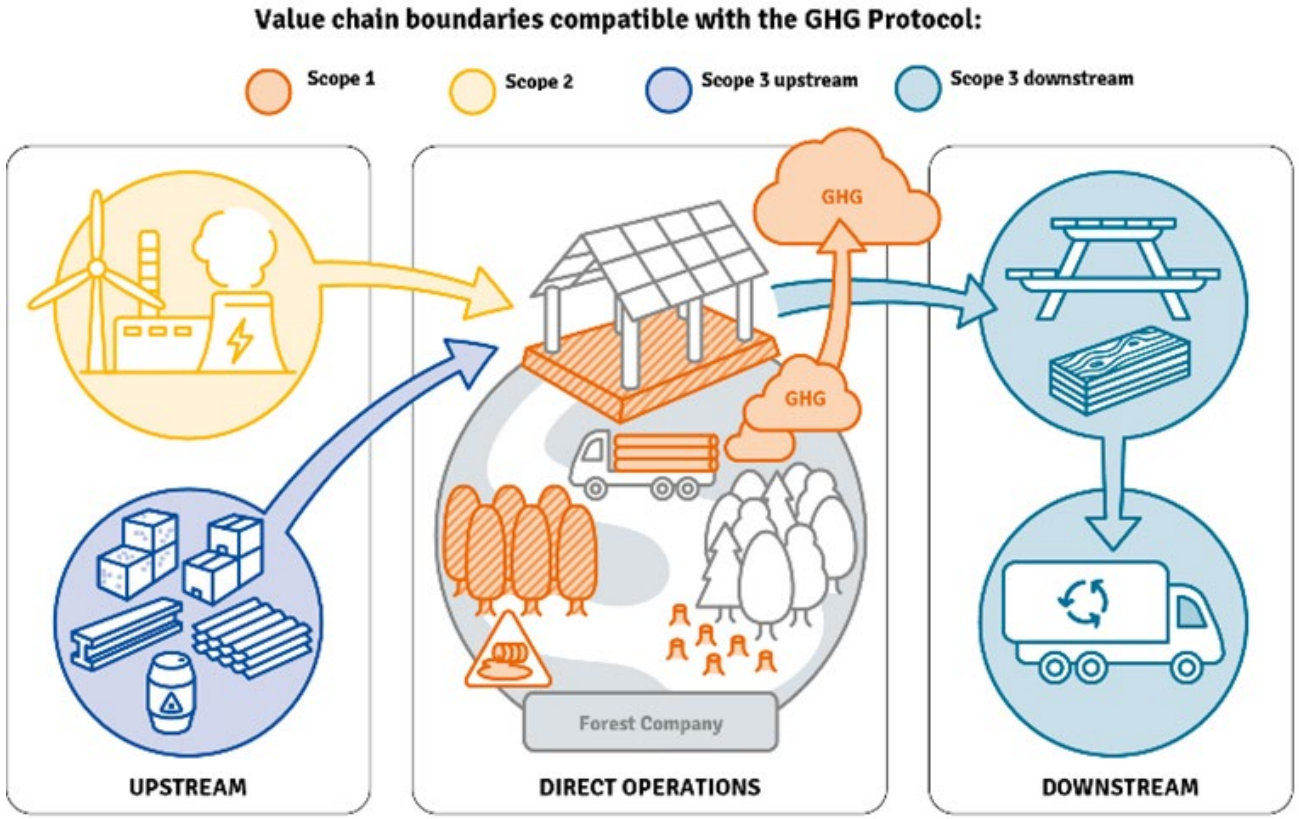
- Direct impacts of companies

Scope 2

- Impacts from energy provision

Scope 3

- Upstream and downstram impacts



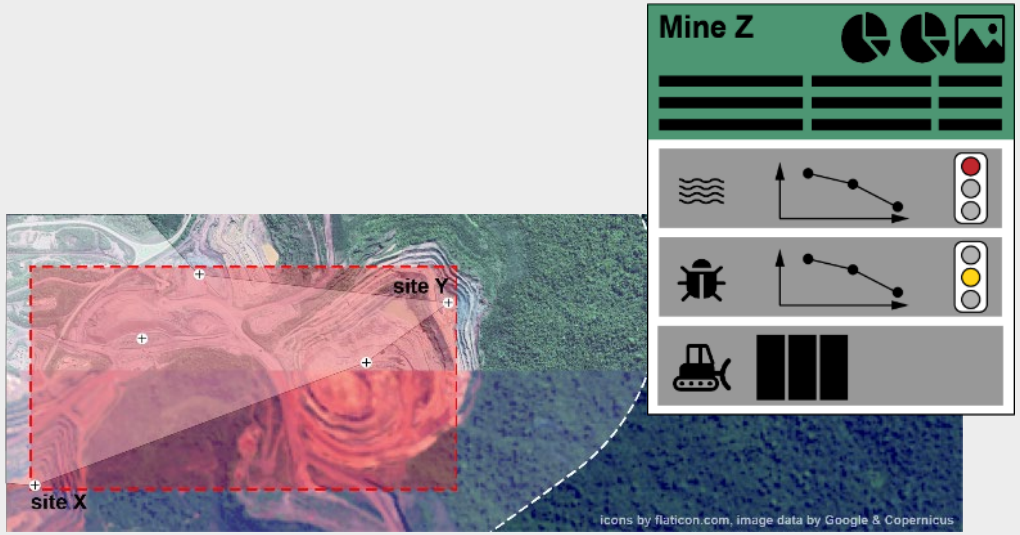
Remote sensing products only cover direct impacts on biodiversity and water scarcity in Scope 1

Life Cycle based approaches for scope 2 + 3 biodiversity impact

From spatial geoscience to sustainable finance

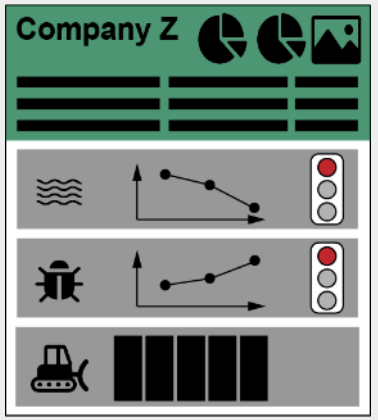
Local Impact Analysis & Global Life-Cycle Assessment

For example: Local gold mine



Company-level Impact Analysis

Int. Mining Company



Consistent Data

↓

Consistent Assessment and Ratings

↓

Evidence-based Decisions

Who are we?

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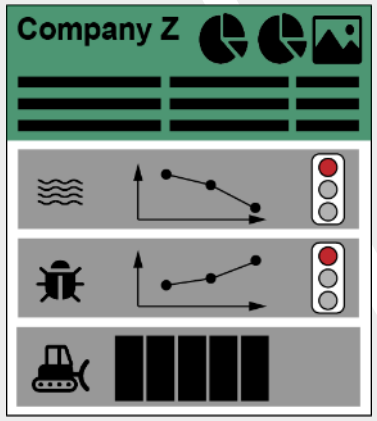
Tomasz Orpiszewski
Sustainable Finance

Patrick Laube
Spatial Geoinformatics

Rene Itten
Life-Cycle Assessment

Alexander Posth
Finance and ML



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