

Fit for Biodiversity – Solutions for the Agri-Food Sector

RISE Biodiversity Database for Food

A tool for measuring the impact on biodiversity from food

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Sustainable Food Systems

Project partners



With financial support from

Premium partners

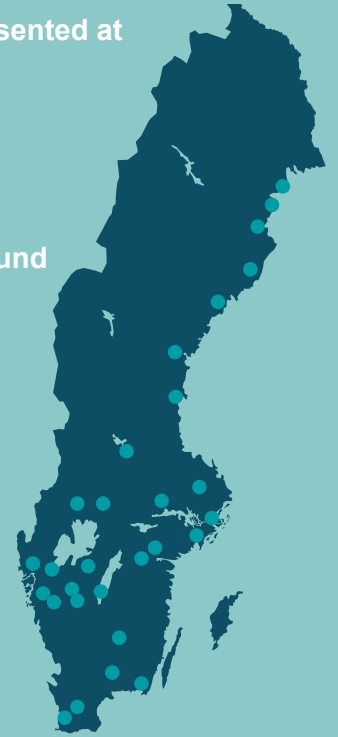
A bridge between academia and industry

- RISE, Research Institute of Sweden
 - A state-owned research institute who contribute to transforming knowledge from research into sustainable solutions
- Sustainable food systems
 - Contributes to sustainable choices and decisions in the food supply chain

RISE is represented at

35

locations around Sweden



Approx.

3,300

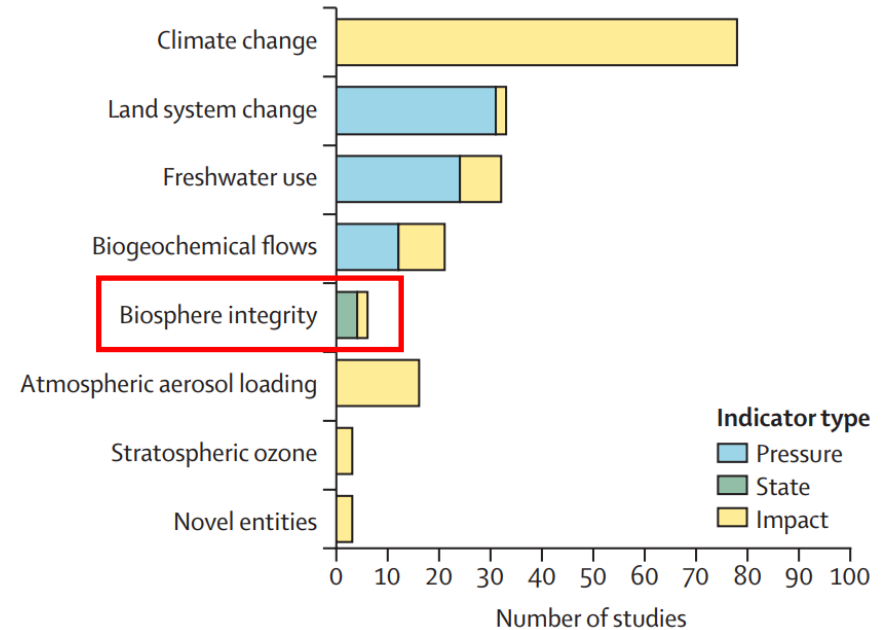
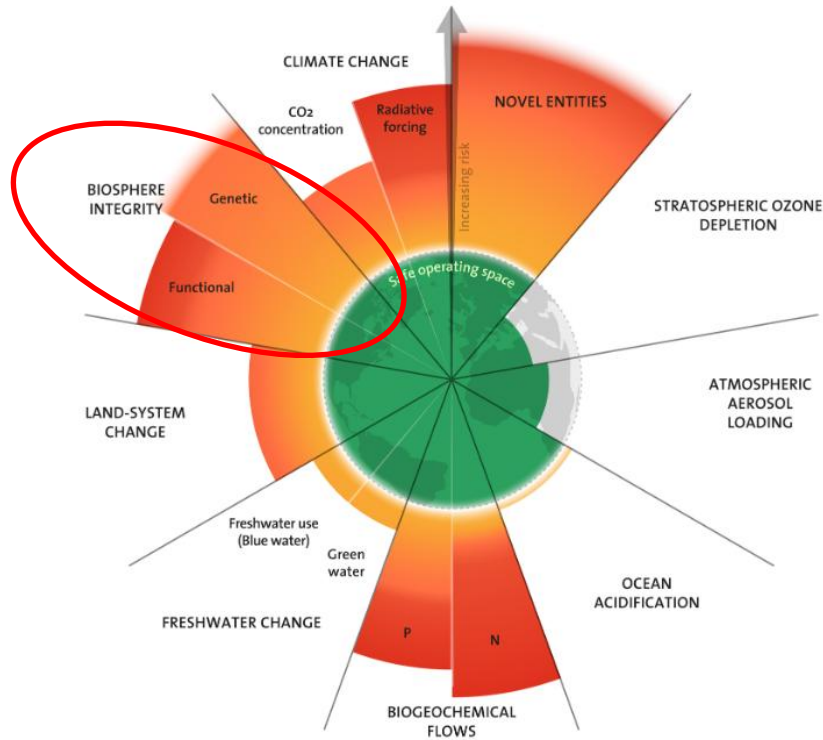
employees

Approx.

380

EUR million, net sales

We are in a biodiversity crisis



Planetary health check, 2025, Stockholm Resilience Centre

Source: Ran et al. (2024), [\[link\]](#)

Biodiversity crisis is also a business crisis

- Business depends on nature – *especially the food industry*
- Losing biodiversity at alarming rates
- Food industry is also major driver of biodiversity loss

Business needs practical ways to assess their impact and understand where to act!

Approximately 50%

Of the global GDP is dependent on nature (1)

-73%

Average decline of monitored vertebrate wildlife populations since 1970, WWF (2024) Living Planet Index (2)

>50%

Of biodiversity impact is estimated to arise from food and beverage supply chain (3)

1) World Economic Forum

2) WWF (2024): [Living Planet Index](#)

3) Boston Consulting Group, BCG (2021). *The Biodiversity Crisis Is a Business Crisis*

A solution: RISE Biodiversity database for food

Identify hotspots

Which food products cause the highest impact?

Select ingredients

Compare origin and production method

Set targets

For biodiversity and start acting

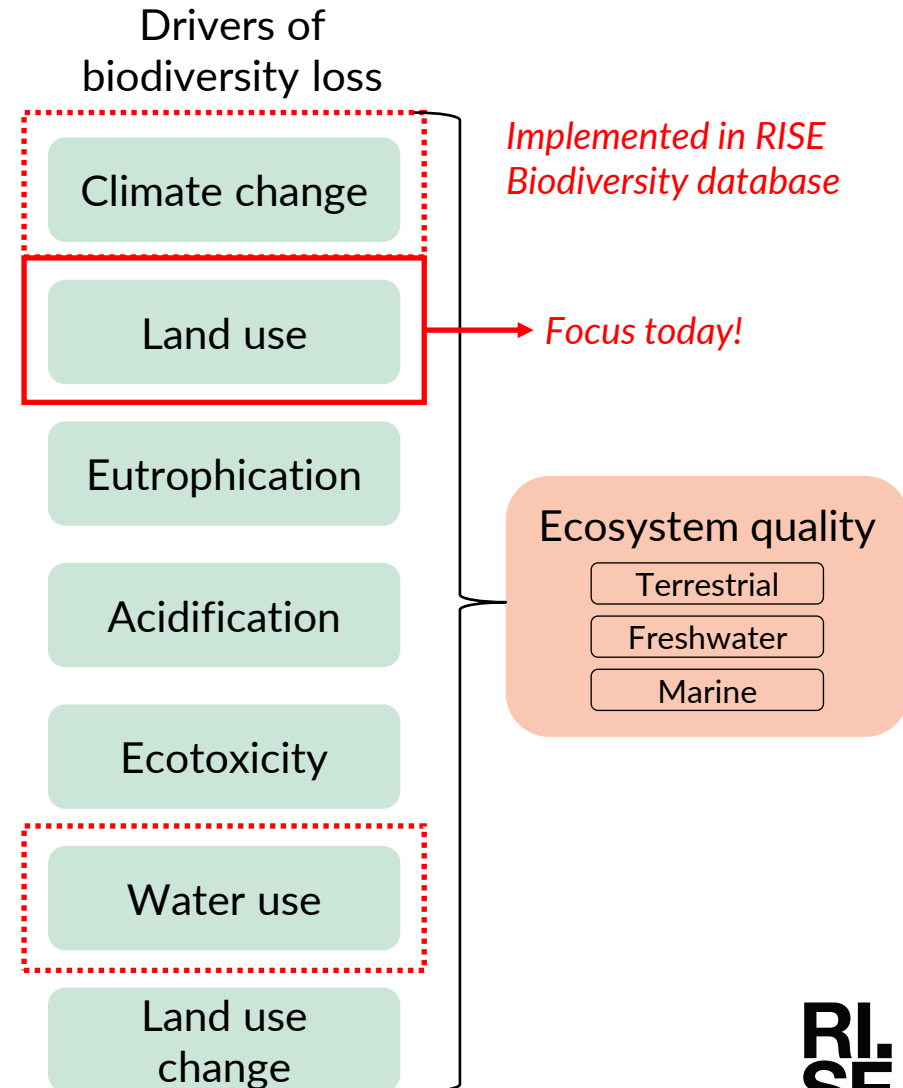


Methodology

RISE Biodiversity database

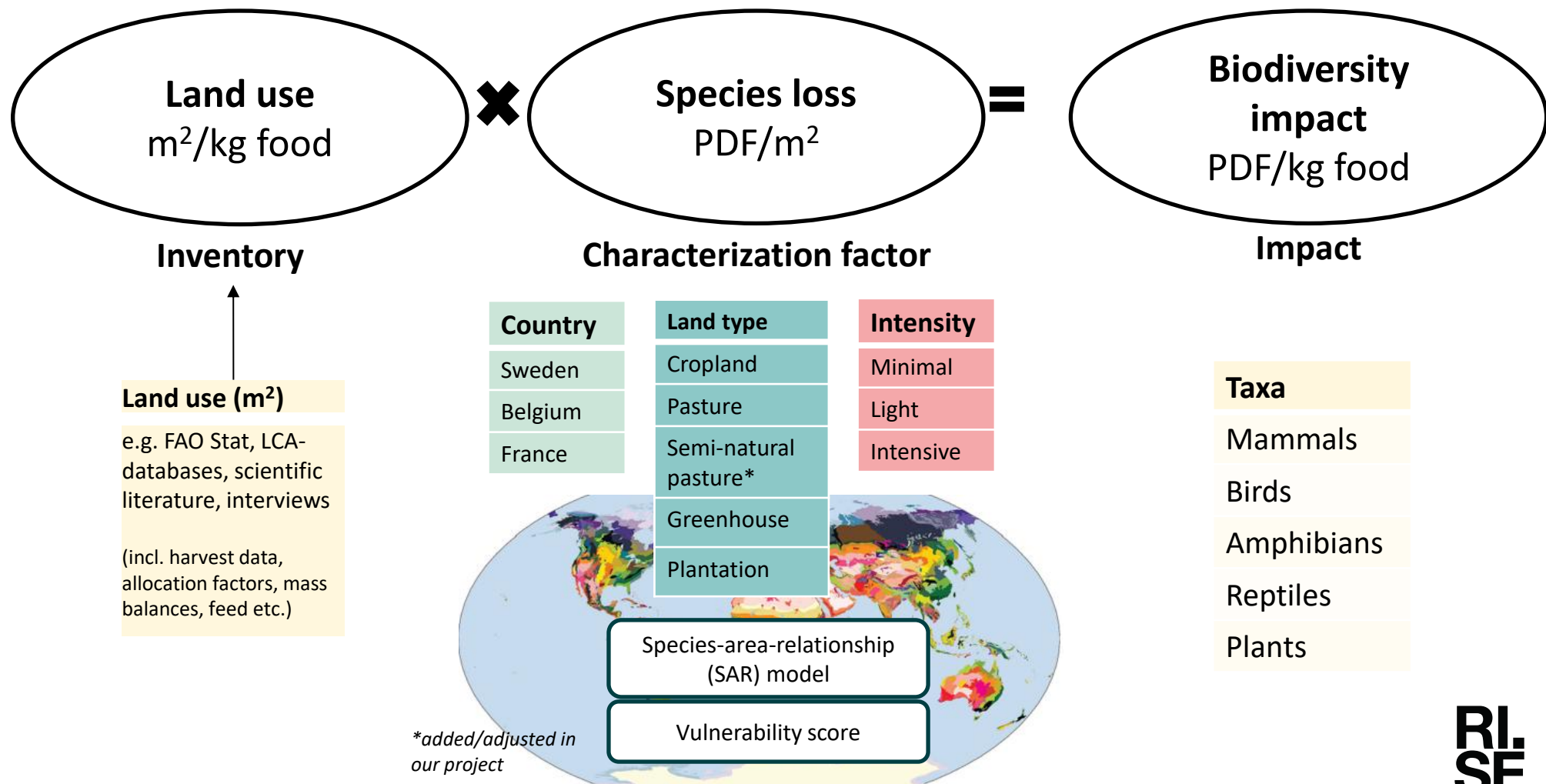
- LCA-based methods, recommended by UNEP-SETAC Life Cycle Initiative*
- Biodiversity impact based on:
 - Land use
 - Climate change
 - Water use
- Methods for eutrophication and ecotoxicity evaluated
 - Data challenges remain

* UNEP Life Cycle Initiative, 2024, GLAM (Global guidance for LCIA Indicators and methods)



Land use impact on biodiversity

Based on: Scherer, L., Rosa, F., Sun, Z., Michelsen, O., De Laurentiis, V., Marques, A., ... & Kuipers, K. J. (2023). Biodiversity impact assessment considering land use intensities and fragmentation. *Environmental science & technology*, 57(48), 19612-19623.



Impact of food on biodiversity

- Land use impact assessed for approximately **380 food products**
 - Fruits, vegetables, legumes, dairy, animal products, composite food
- Origin and production method matter
- Methodology developed internally
 - Semi – natural pasture
 - Organic farming

Food product	Origin	Production method	Land use impact biodiversity (fPDF/kg)
Cocoa	Ecuador	Conventional	1 180
Beef	Brazil	Conventional	1 955
Avocado	Peru	Conventional	328
Pasta	Italy	Conventional	27
Rapeseed oil	Germany	Conventional	13
Orange	Spain	Conventional	13
Beef	Brazil	Conventional	1 955
Beef	Sweden	Conventional	1
Beef	Sweden	Semi-natural pasture	-15
Banana	Costa Rica	Conventional	32
Banana	Costa Rica	Organic	22

What affects the biodiversity impact of land use?

Higher impact

- Produced in sensitive ecosystems, e.g. coffee, cocoa, fruits, nuts from tropical areas/islands, *and/or*
- Require large land area per kg of produced food

Lower impact

- Produced in less sensitive areas/vulnerable ecosystems with less endemic species present, *and/or*
- Intensive production, low land use per kg of food

Examples from the impact of *land use*

Product	Origin	fPDF/kg	Higher impact
Beef	Brazil	1 955	
Cocoa	Ecuador	1 180	
Coffee	Colombia	961	
Almonds	Spain	875	
Olive oil	Portugal	490	Lower impact
Lentils	Canada	6,8	
Lettuce	Spain	5,7	
Rapeseed oil	Sweden	3,5	
Apple	France	1,1	
Tomato	Netherlands	0,08	

Biodiversity scale

A simple scale to prioritise where to act:

- 
Level 1: Best option - prioritise
Beef, seminatural pasture from Sweden
- 
Level 2: Good option
Apples from Sweden
- 
Level 3: Moderate impact
Avocado from Mexico
- 
Level 4: High impact
Walnuts from Chile
- 
Level 5: Very high impact - avoid
Beef from Brazil

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Integrate climate and water impact to the scale

Biodiversity scales for land use impact

Level Category	1 Best option	2 Good option	3 Moderate impact	4 High impact	5 Very high impact
Protein sources				Walnuts, CHILE	Beef, BRAZIL
Carbohydrates	Pasta, SWEDEN		Sweet potato, USA		
Fats			Palm oil, BRAZIL		
Vegetables, fruits		Apples, SWEDEN			Avocado, MEXICO
Beverages, incl. milk					
Dairy, excl. milk					
Composite food					
Concentrated products and flavourings					

Challenges and opportunities

-

- Method land use impact "rewards" intensive production systems
- Challenge in capturing organic farming
- Assess impact on a national level, but biodiversity impact acts on local scale
- Measurements taken at farm difficult to capture

+

- Increased knowledge in "what is high/low" impact from food production
- Identify hot-spots to initiate measurements
- Guidance in selecting more nature friendly products

Getting started in five steps

1

Mapping

Analyse the largest
sales/purchasing
volumes

2

Identify

Find the “hot-
spots” driving the
impact

3

Compare

Try alternatives,
origin, supplier,
production method

4

Steer

Update strategy for
purchasing, change
recipes

5

Follow up

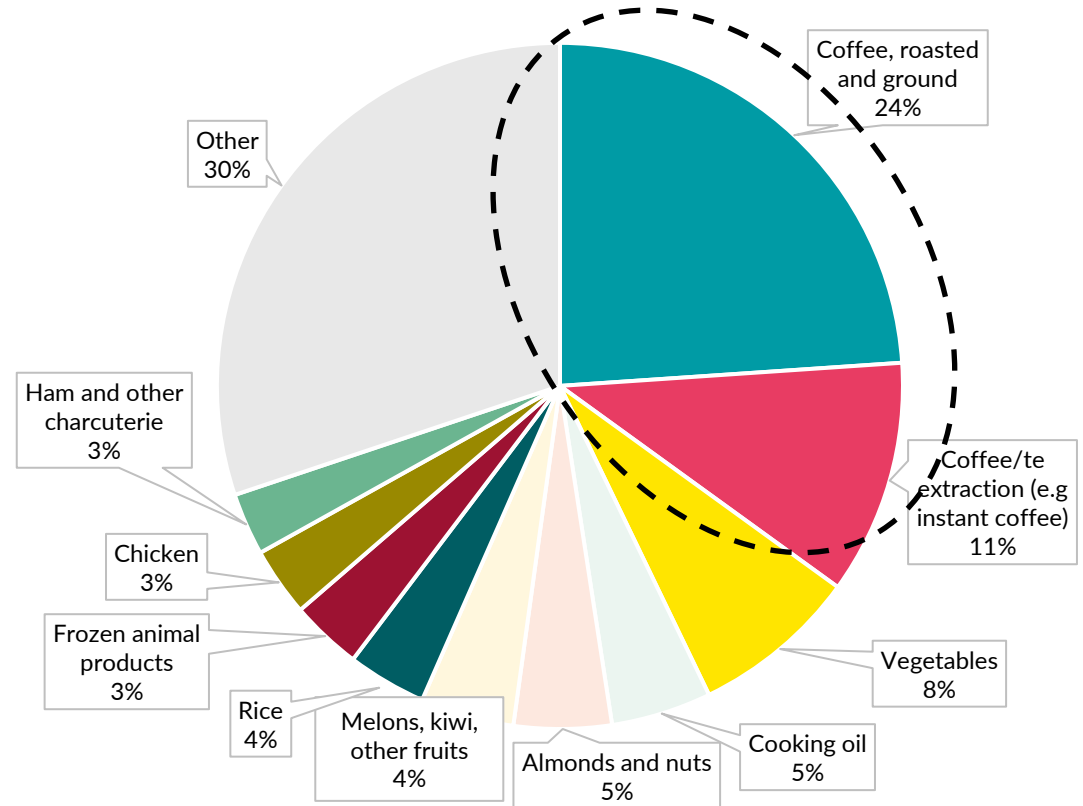
Set targets and
follow up

Case study

With one major grocery wholesaler,
COOP in Sweden

- Analysed sold products of **own product brand** (1115 articles)
- 10 product categories represented 70% of the impact
 - Hotspot → coffee
- Other food items causing high impact
 - E.g. bananas, melons, olive oil

Product categories with highest impact



A close-up photograph of a bee on a blue thistle flower. The bee is positioned on the upper part of the flower, facing left. The flower is a vibrant blue color with many small, pointed petals. The background is a soft, out-of-focus green.

Looking forward

- Include more drivers of biodiversity loss for a holistic perspective
- Case studies with partners and applying the database
- Investigate the opportunity to link the results to planetary boundaries
- Explore the possibility to combine methods for local assessment

Biodiversity database Team

LCA



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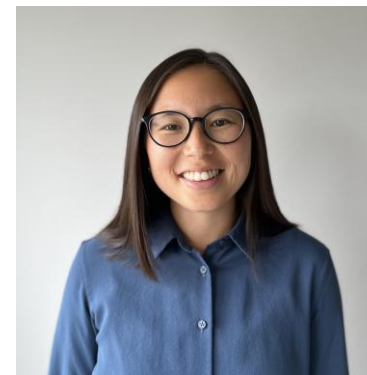
Viktor Kardeby

Digital systems

Want to know more?

<https://www.ri.se/en/food/expertise/rise-food-biodiversity-database>

Thank you for listening! Questions?



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