

Development of crop specific ecoregion factors for countries for biodiversity impact assessment

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Biodiversity Impact

- Biodiversity describes the variety of all kinds of life
- Loss of biodiversity = climate crisis
- Agriculture is a central factor as it uses about 38 % of the global land surface area ¹
- Assessing the impact in LCA using the method developed by Lindner et al. ²

$$\text{Impact} = \underline{\text{EF}} * (1 - BV_{norm}) * A * \Delta t$$

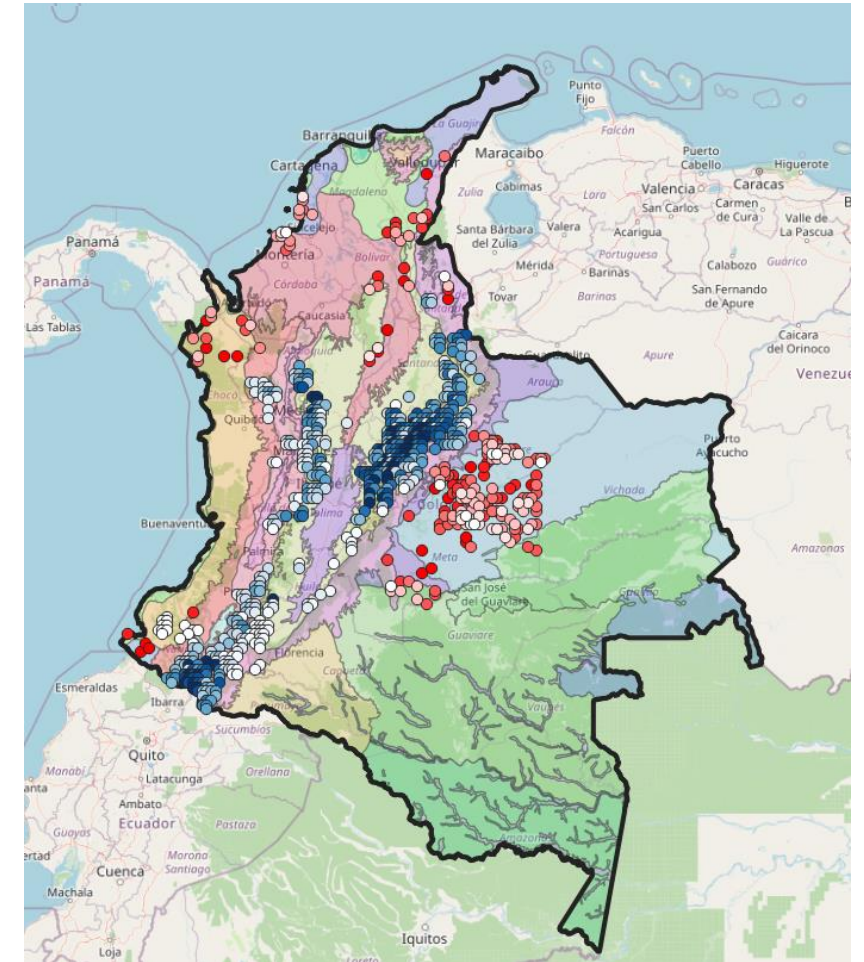
- Concept of ecoregion factors (EF) introduced to quantify ecosystem value



*Photo by Damien DUFOUR
Photographie on Unsplash*

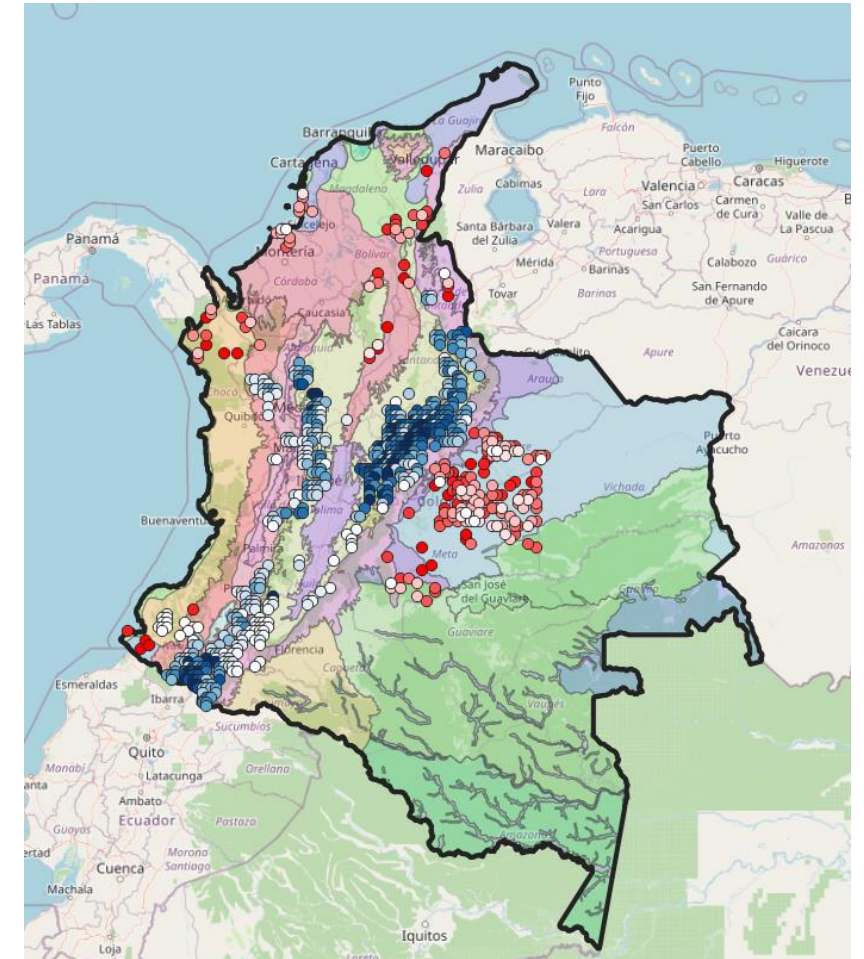
Countries, Ecoregions, Crops

- Trade flows of crop products usually refer to countries
- Often times there are many ecoregions within one country
- Crop production is not homogeneous inside country borders

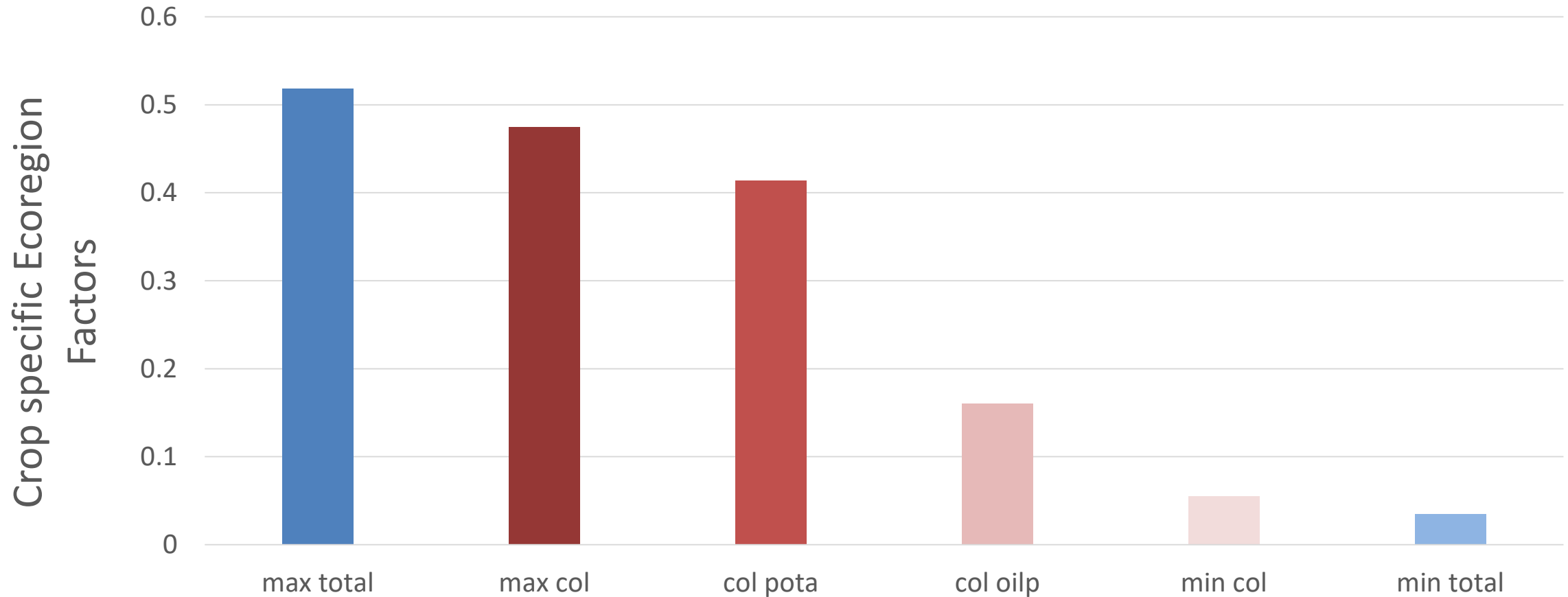


The Data

- GIS-Data Ecoregions:
 - Primary dataset by The Nature Conservancy
 - Dataset for North America from Ecoregions2017 by RESOLVE
- Ecoregion-Factors:
 - Lindner et al. 2019 ³
- Crop data:
 - SPAM 2010 v2.0
 - 42 FAO crops included
 - Weighting based on production quantity
 - Rainfed and irrigated crops



Crop specific Ecoregion Factors for countries (csEF) of selected datapoints



Conclusion and outlook

- ✓ Dataset of crop and country specific Ecoregion Factors
 - ✓ For Usage in **Biodiversity Impact Assessment** where exact origin of crops is unknown
 - ✓ Data available for **188 countries, 42 FAO crops**
 - ✓ **Large differences** for crops of the same country show the **importance** of a more specific generic dataset
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- Evaluate the data for all SPAM variables and technologies
 - Add robustness indicator



Thank you for your attention!

If you want to connect, please use the following email:
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- 1: <http://www.fao.org/sustainability/news/detail/en/c/1274219/>
- 2: Lindner, J.P.; Eberle, U.; Knuepffer, E. et al. (2021): Moving beyond land use intensity types: assessing biodiversity impacts using fuzzy thinking. *Int J Life Cycle Assess* 26, 1338–1356 (2021). <https://doi.org/10.1007/s11367-021-01899-w>
- 3: Lindner, J.P.; Fehrenbach, H.; Winter, L.; Bloemer, J.; Knuepffer, E. (2019): Valuing Biodiversity in Life Cycle Impact Assessment. *Sustainability* 2019, 11, 5628. <https://doi.org/10.3390/su11205628>