

## Treiberdaten aus dem Bereich der genutzten Landschaften

# Treiber für den Verlust an biologischer Vielfalt

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- Veränderung von Lebensräumen inkl. Schrumpfung, Degradierung, Fragmentierung und kompletter Verlust von natürlichen Habitaten
- die Übernutzung von Böden
- die allgemeine Umweltverschmutzung
- die Einführung nicht-nativer Arten
- Klimawandel

# Potentielle Treiberdaten

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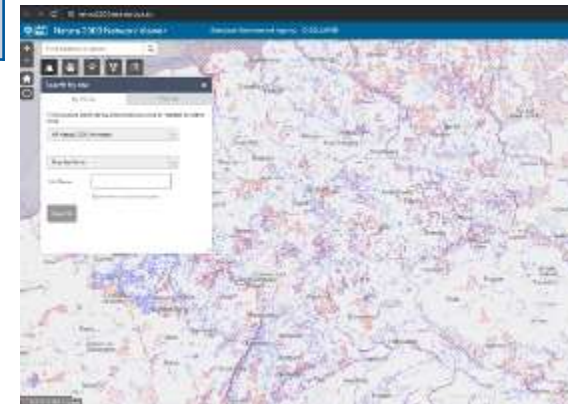
<b>Natura 2000 public database</b>
<b>Levers et al. (2016), Land System Archetypes</b>
<b>EU Waterbase</b>
<b>LUCAS - Land use and land cover survey</b>
<b>FADN - farm accountancy data network</b>
Copernicus global land cover 2015, ESA CCI ...
openstreetmaps
MAPSPAM (global production/yield model)
EUROSTAT
IÖR Monitor
<b>Statistische Landesämter ...</b>

Disclaimer: nicht ansatzweise vollständig!

<b>Dataset Name</b>	<b>Natura 2000 public database</b>
Description	27,000+ protected sites covering 1,150,000+ km2
Type	database, site based polygons
Spatial Resolution	EU-wide, site level
Reference Time	2012-2018 (yearly updated)
Temporal Resolution	... it's complicated
Usage Rights	public
Link	<a href="https://natura2000.eea.europa.eu/">https://natura2000.eea.europa.eu/</a>

## Driver(s)

Multiple **qualitative** drivers related impacts of land-use on habitats in protected areas (e.g. change in practice, intensification, fertilizer, irrigation, grazing, mowing). Derived by managers.

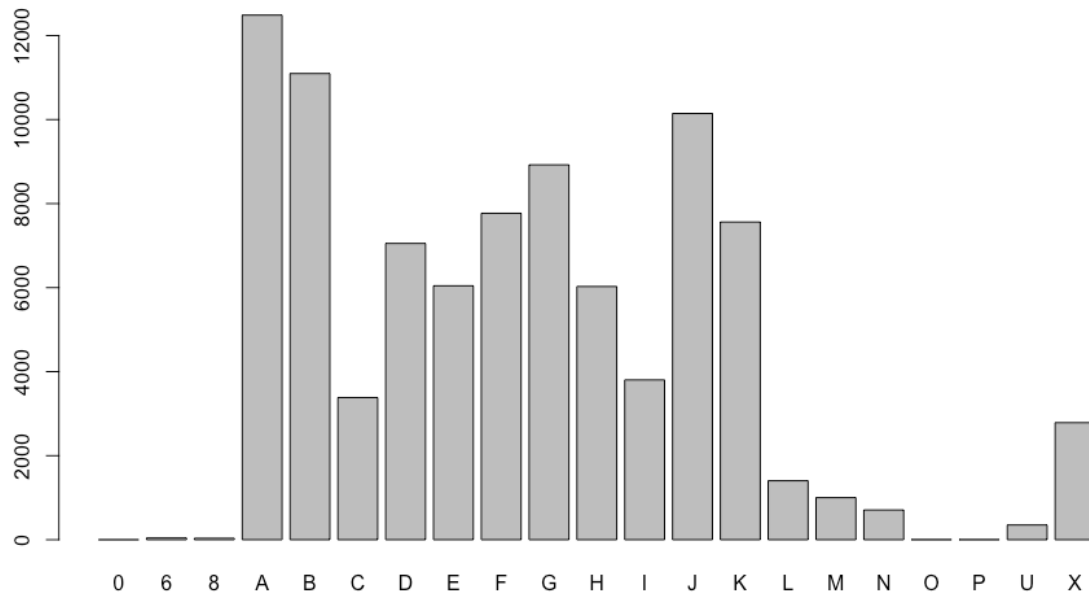


General structure of SDF

Impacts

Conservation status by species

# Tier 1 impacts per Natura2000 site in EU



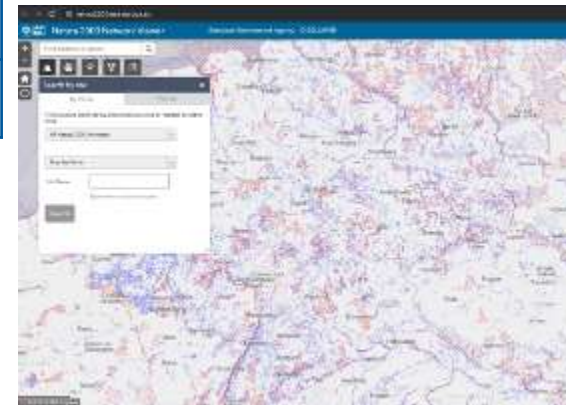
ACT_Code	Descript_EN
A	Agriculture
B	Sylviculture, forestry
C	Mining, extraction of materials and energy production
D	Transportation and service corridors
E	Urbanisation, residential and commercial development
F	Biological resource use other than agriculture & forestry
G	Human intrusions and disturbances
H	Pollution
I	Invasive, other problematic species and genes
J	Natural System modifications
K	Natural biotic and abiotic processes (without catastrophes)
L	Geological events, natural catastrophes
M	Climate change
X	No threats or pressures
XO	Threats and pressures from outside the Member State
XE	Threats and pressures from outside the EU territory
U	Unknown threat or pressure

Dataset Name	Natura 2000 public database
Description	27,000+ sites covering 1,150,000+ km2
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- + extensive data source on protected sites
- complicated structure, prone to bias, mostly qualitative, no real time series

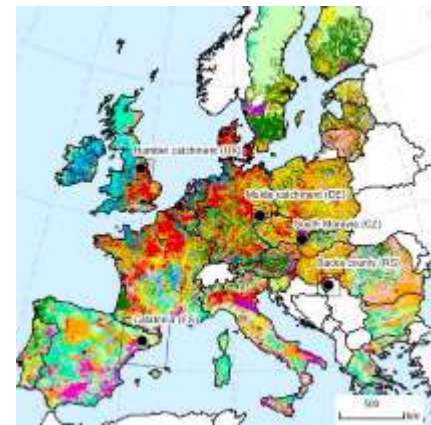


Dataset Name	Levers et al. (2016)
Description	land-system archetypes (characteristic patterns of land-use extent and intensity); archetypical <b>change trajectories</b> (ACTs, characteristic changes)
Type	raster
Spatial Resolution	Europe, 1 km <sup>2</sup>
Reference Time	2006 (ACTs 1990-2006)
Usage Rights	Request from author
Link/DOI	<a href="https://doi.org/10.1007/s10113-015-0907-x">10.1007/s10113-015-0907-x</a>

## Driver(s)

Multiple drivers related to intensification and extensification of land-use. Based on land cover, census data and expert opinion.

- + clusters of similar land systems and their changes
- timeliness of underlying data, no time series, not public



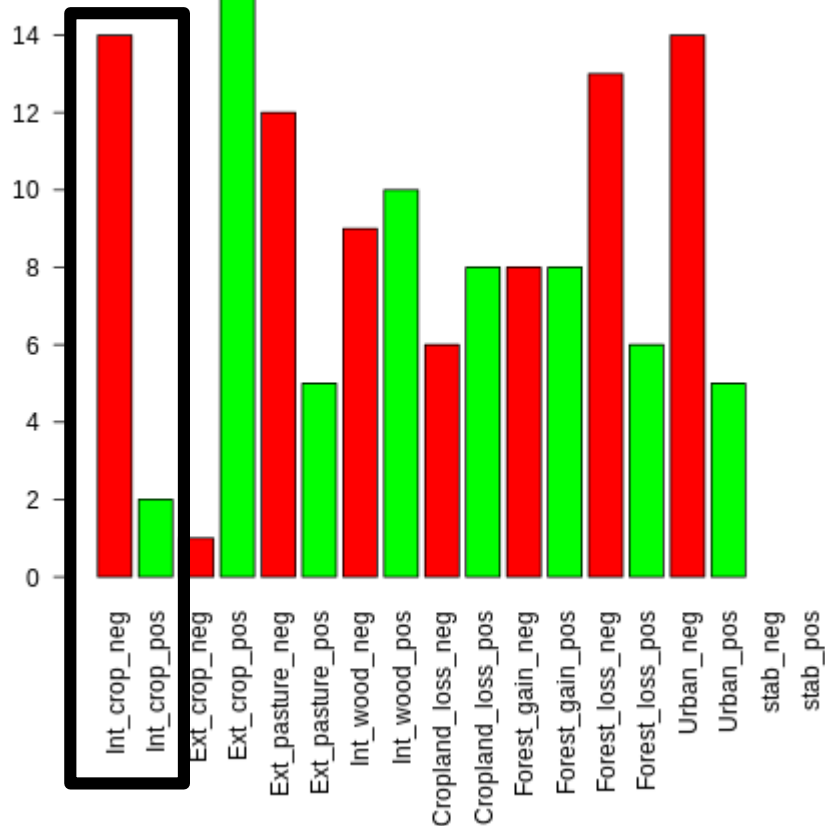


# ACTs grouped in 9 categories

	b	Cluster	Description	Area [km <sup>2</sup> ]	Area share [%]
Intensification of cropland	ACT01		<b>Increasing yields in permanent crops:</b> above average increases in permanent cropland yields	72.801	1,72
	ACT02		<b>Increasing cropland yields:</b> above average increases in arable crop yields	200.790	4,75
	ACT03		<b>Intensification towards high-intensity cropland:</b> shift from medium towards high fertiliser input on arable cropland	72.090	1,7
	ACT04		<b>Intensification towards medium-intensity cropland:</b> shift from low towards medium fertiliser input on arable cropland	55.764	1,32
De-intensification of cropland	ACT05		<b>Declining cropland yields:</b> above average decreases in arable cropland yields	146.205	3,46
	ACT06		<b>De-intensification of high-intensity cropland:</b> shift from high towards medium fertiliser input on arable cropland	71.784	1,7
De-intensification of pasture	ACT07		<b>De-intensification of medium-intensity cropland:</b> shift from medium towards low fertiliser input on arable cropland	98.649	2,33
	ACT08		<b>Declining grassland yields:</b> above average decreases in grassland yields	251.640	5,95
Woodland intensification	ACT09		<b>De-intensification of high-intensity livestock farming:</b> shift from high-intensity towards medium-intensity livestock density	99.396	2,35
	ACT10		<b>De-intensification of medium-intensity livestock farming:</b> shift from medium towards low livestock density	73.089	1,73
Forest gain	ACT11		<b>Intensification of wood production:</b> above average increases in wood production rates	241.380	5,71
	ACT12		<b>Forest expansion over grassland:</b> above average increases in forest cover at the expense of grassland cover	371.853	8,79
Forest loss	ACT13		<b>Deforestation for agricultural expansion:</b> above average decreases in forest cover and harvesting and increases in arable and permanent cropland cover	56.970	1,35
	ACT14		<b>Cropland-grassland conversions:</b> above average decreases in arable cropland and increases in grassland cover	476.118	11,25
Cropland loss	ACT15		<b>Permanent cropland loss:</b> above average decreases in cropland cover dominated by permanent crops and increases in grassland and forest cover	75.609	1,79
	ACT16		<b>Urban expansion:</b> above average increases in urban built-up cover	129.600	3,06
Urban expansion	ACT17		<b>Stability:</b> no substantial changes for any indicators	1.737.126	41,06
				4.230.864	100

# Combining Levers ACTs and conservation status from Natura 2000

birds of prey full model: inside and outside SPAs



- Analysis of conservation status as rated by site managers for specific species: “A” (“excellent conservation”), “B” (“good conservation”) or “C” (“average or reduced conservation”).
- Summarized across EU
- Logistic regression models fitted to an ordered factor response (Conservation status by species)

Dataset Name	EU Waterbase
Description	time series of nutrients, organic matter, chemicals etc. in EU rivers, lakes and groundwater.
Type	Points database
Unit	multiple
Coverage	10000+ measurement points
Reference Time	2000- (yearly updated)
Usage Rights	public
Link	<a href="https://www.eea.europa.eu/data-and-maps/data/waterbase">https://www.eea.europa.eu/data-and-maps/data/waterbase</a>

## Driver(s)

Directly for biodiversity in water bodies.  
Indirectly on upstream areas through run-off (e.g. change in practice, intensification, fertilizer).

- + extensive data source, freely available
- complicated structure, data gaps, indirect drivers for land-use



<b>Dataset Name</b>	<b>LUCAS - Land use and land cover survey</b>
Description	EU wide point survey based land-cover (300000+ visited). Multiple soil separate soil datasets.
Type	Points or 1km2 rasters
Spatial Resolution	EU-wide, point based
Reference Time	2006-2018 (three-yearly updates)
Temporal Resolution	Depends, typically one year only
Usage Rights	On request
Link	<a href="https://esdac.jrc.ec.europa.eu/resource-type/datasets">https://esdac.jrc.ec.europa.eu/resource-type/datasets</a>

## Driver(s)

Available data for soil related drivers include: physical properties, heavy metal contents, soil organic matter, soil GHG fluxes, net erosion by water and wind, soil loss and many more.



+ extensive data source on soil properties

- not freely available, most data no time series, fragmented

<b>Dataset Name</b>	<b>FADN - farm accountancy data network</b>
Description	Questionnaires on farm income and subsidies conducted with representative sample of EU farms (appr. 80 000)
Type	Database
Spatial Resolution	EU-wide, FADN regions
Reference Time	2004-2017
Temporal Resolution	yearly updated
Usage Rights	Micro level data on request
Link	<a href="https://ec.europa.eu/agriculture/rica/index.cfm">https://ec.europa.eu/agriculture/rica/index.cfm</a>

## Driver(s)

Potential indirect drivers based on subsidies received for specific crops, general inputs (fertilizers, stocking density etc.), production area by crop.



- Indirect source of drivers, only representative sample, difficult to get micro level data, database structure

FADN variables for selection

<b>Dataset Name</b>	<b>Statistische Ämter des Bundes und der Länder</b>
Description	Tabular data for 294 districts (Kreise und kreisfreie Städte)
Type	Database
Spatial Resolution	Districts (Kreise)
Reference Time	1999 - 2018 (yearly updated)
Usage Rights	public
Link	<a href="https://www.regionalstatistik.de/">https://www.regionalstatistik.de/</a>

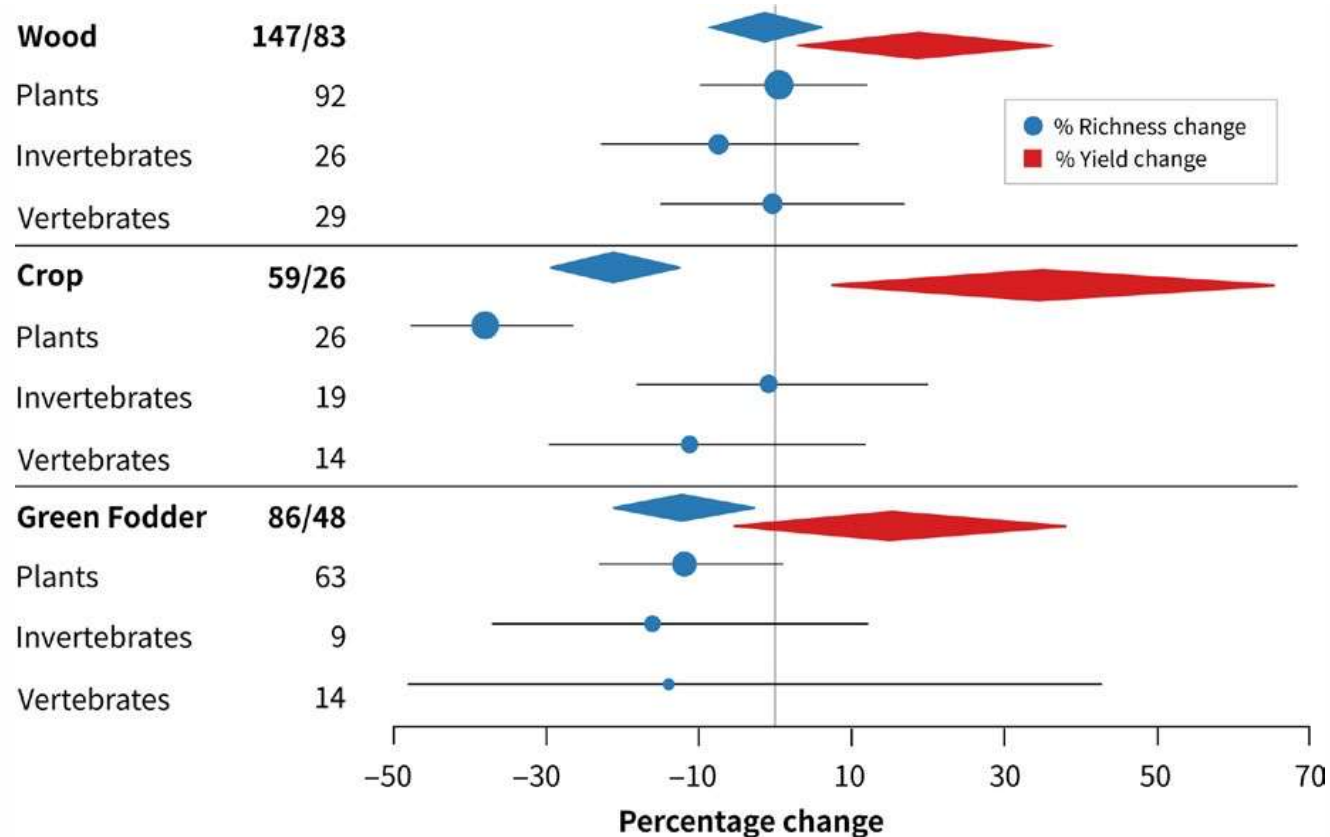
## Driver(s)

Multiple **quantitative** drivers at district scale, e.g. yields per ha for 10 main crops, agricultural area per crop, livestock units per farm. Includes tourism and many more potential drivers.

+ readily accessible, time series data

- coarse spatial resolution, limited selection of variables


# Globale Metaanalyse: Biodiversität+Ertrag+Intensivierung

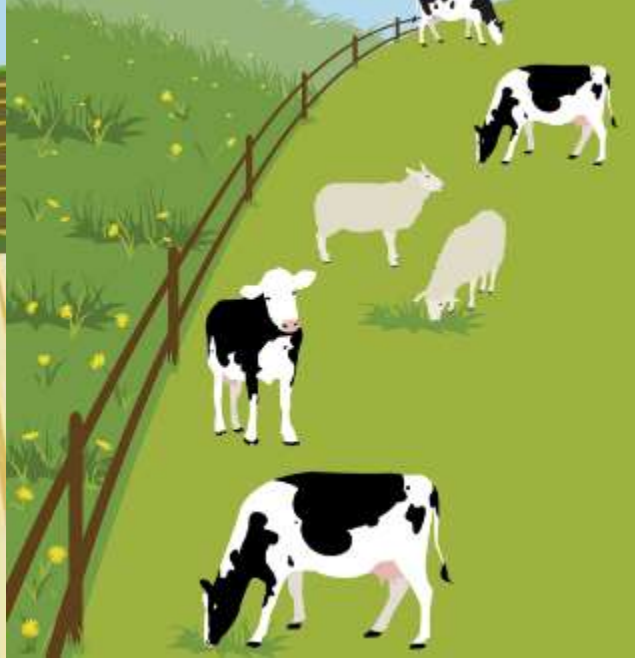




# Conclusion

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1. We need **more studies** precisely reporting on the three-way relationship between **land use intensity**, biodiversity and yield. 
2. Conventional intensification **can — if carried out in small steps** — increase yield without coming at the expense of species richness.
3. All (**even high intensity**) agricultural/silvicultural production systems harbour species that can and will be lost through intensification.



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