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Economic incentives that affect Biodiversity

Contributions from an International expert workshop

Vera Taborski and Edgar Schütte (Eds.)

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Contributions from an International expert workshop on Vilm, Germany, 13 – 16 June 2023

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Cover image: **Old oak tree with several branches on the Isle of Vilm (Photo: E. Schütte)**

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Foreword

Economics is a social science trying to explain limited resource allocations in studying production, consumption and distribution of goods and services. It uses economic behaviour (or that of an economic agent) as a tool in doing so. This behaviour in turn, depends on available information, preferences and [economic] benefits or costs and the resulting incentives. From a decision-making perspective, this means that economic incentives are created, whenever a potential economic benefit arises or potential economic costs are avoided. Economic costs are not necessarily only prices expressed in monetary units, but also time or labour required, for example. In addition to the reference to monetary units, with which economic incentives are often associated, incentives can also explain altruistic behaviour. An agent deriving a personal benefit from e.g. charity work has the motivation to continue doing so. This benefit provides an incentive for this person's altruistic behaviour. Loosely speaking, in economics as a science, economic incentives are what motivates (human) behaviour.

To steer incentives, mechanisms can be set in place. According to the IUCN, mechanisms that are especially relevant for biodiversity and nature conservation, are those that (1) are targeted to specific objectives to encourage conserving efforts via rewards (e.g. subsidies), those mechanisms that (2) put in place general enabling conditions which will cause behavioral changes in people's economic activities (e.g. institutional settings) and those mechanisms that (3) penalize and discourage unwanted activities that leading to degrading biodiversity (e.g. fines). This presupposes, that leading causes for degradation of the natural environment are known and recognized.

Acknowledging this, is the 2022 adopted Kunming-Montreal Global Biodiversity Framework. Its target 18 aims to identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least 500 billion United States dollars per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity. The EU's 2030 Biodiversity Strategy also articulates the ambition to promote tax systems and pricing that reflect environmental costs, including biodiversity loss.

With these developments in mind, from 13.-16.06.2023, the German Federal Agency for Nature Conservation (BfN) hosted the international expert workshop "Economic Incentives that affect biodiversity" on the Isle of Vilm. The event was attended by around 30 participants from more than 10 countries and provided a platform for exchange between experts from science, administration and civil society. The workshop looked at existing economic incentives such as taxes, subsidies, and market-based approaches that affect biodiversity. Additionally, also the variety of economic instruments that offer potential to promote biodiversity conservation were discussed.

The workshop was divided into four sessions: 1) International targets on economic incentives and how to reach them; 2) Economic incentive settings within Europe; 3) Economic incentive settings – international perspectives; and 4) Sector insights: Agriculture and biodiversity within Europe. This publication showcases some of the contributions that were given by the panellists during the event. Article 1 highlights the implementation of the Kunming-Montréal Global Biodiversity Framework and gives an overview of the situation in four European countries. Article 2 and 3 share insights on biodiversity harmful subsidies in Switzerland and Germany, respectively. Article 4 showcases promises and pitfalls of the EU's Common Agricultural

Policy. Article 5 deals with economic instruments used for the conservation of biodiversity in Lithuania.

The organizational team of the workshop would like to thank all of the contributors and participants for their excellent presentations and the inspiring discussions. Both, organizers and participants of this expert workshop, were able to gain new insights on how economic incentives currently affect biodiversity and which role they (can) play in safeguarding biodiversity. With the proceedings of this workshop we try to further strengthen the interdisciplinary exchange and to inform other stakeholders about economic incentives that affect biodiversity. We are very grateful to the authors included in this publication for their willingness to make their workshop contributions accessible to a broader audience as well as for their dedication and patience in the publishing process.

Vera Taborski

Edgar Schütte

German Federal Agency for Nature Conservation (BfN)

1 Implementation of the Kunming-Montréal Global Biodiversity Framework's target 18 – an overview of the situation in 4 European countries

Friedrich Wulf, Friends of the Earth Europe and Swiss IUCN Committee

Abstract

Incentives harmful for biodiversity have been identified as an important driver of biodiversity loss already when the Convention on Biological Diversity (CBD) came into existence in 1992. In consequence, the CBD strategic plan for biodiversity 2010-2020 contained a target to eliminate these incentives. As this target – like almost all others - was not achieved, the new Kunming-Montréal Global Biodiversity framework (KMGBF) renewed this in target 18 to "eliminate, phase out or reform incentives harmful to biodiversity.

The publication and presentation of a study on subsidies harmful to biodiversity (BHS) in Switzerland produced by Gubler et al. (2020) (see article 2. Biodiversity damaging subsidies in Switzerland – an overview by Gubler & Seidl in this volume) led to a wide debate and political decisions to analyze and eliminate subsidies in the country.

The Swiss IUCN Committee used the opportunity of the adoption of the KMGBF to put the national debate into an international context and arranged a conference in May 2023. The international part of the conference consisted of presentations by Friedrich Wulf (Swiss IUCN Committee), Katia Karousakis (OECD), Aldo Ravazzi Douvan (Ministero dell'Ambiente e della Sicurezza Energetica, Italy), Vincent Marcus (Ministère de la transition écologique, France) and Kai Schlegelmilch (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, Germany) all giving an overview on (recent) implementation efforts of the above mentioned targets within their countries.

Building on their presentations for the Swiss IUCN Committee Conference, their main findings were presented by the author at the conference on 'Economic Incentives that affect Biodiversity' in Vilm and now in this article.

OECD estimates that environmentally harmful and market distorting government support stands at more than USD 800 billion globally per year, while 78-91 bn US$ are spent in favor of biodiversity globally per year (2015-2017 average). Similar ratios result from the national analyses done in France, Germany and Switzerland. Everywhere the amount of money spent for these subsidies is several times higher than the money spent to maintain and restore biodiversity.

Despite methodological challenges, overviews of biodiversity harmful subsidies now exist for all the countries presented: Switzerland, Italy, France and Germany. Switzerland has a List of 162 subsidies of different types across all sectors. Italy has a catalogue of biodiversity-harmful subsidies, France has an analysis of biodiversity-related finance for the biodiversity strategy (including subsidies), and Germany has produced papers based on previous research (BfN 2019, UBA 2021). Germany and Italy have already successfully eliminated a substantial number of biodiversity harmful incentives, while the actual elimination stands more at an initial stage in Switzerland and France.

1.1 The Task at hand: Target 18 and other decisions by the CBD

On 19 December 2022, the Kunming-Montréal Global Biodiversity Framework (KMGBF) was adopted at CBD COP 15. This framework, which 195 countries across the globe have agreed upon, sets 23 action targets, which need to be met by 2030, in order to "halt and reverse biodiversity loss to put nature on a path to recovery […]." (CBD 2022). One of these targets, target 18, deals with economic incentives that affect biodiversity:

Kunming-Montréal Global Biodiversity Framework: Target 18

"Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least 500 billion United States dollars per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity."

It builds on the Strategic Plan for Biodiversity's 2010-2020 Aichi Target 3 (CBD 2010) which is nearly identical (albeit lacking concrete numbers), and the debate on perverse incentives that the CBD has identified as a major driver of biodiversity loss since its beginnings. Like almost all of the Aichi targets, action has not been sufficient to get anywhere near meeting this Target 3. This is despite the fact that advice and best practice from 11 countries (CBD, 2011), an analysis of the barriers to achieving the target (CBD, 2014a) and a decision with timetable by when which step is to be achieved (CBD, 2014b) were produced or adopted in the early 2010s.

In order to support the implementation of Target 18, the Swiss IUCN Committee organized and held a conference entitled 'Eliminating or transform biodiversity-damaging incentives - Where does Switzerland stand in international comparison, what progress has been made and what are the success factors?' on 11 May 2023, in Bern, Switzerland. This event consisted of two parts, an international one and a national part looking more closely at the situation in Switzerland. This article provides a summary of the international part, giving an overview of the situation in OECD countries and reporting on the progress made in Italy, France and Germany. The analysis for Switzerland (Gubler et al., 2020), which was also presented at the conference, is provided in article 2 in this volume (Gubler & Seidl, 2025, p.24-33).

1.2 Overview of harmful and biodiversity-positive incentives (Katia Karousakis, OECD)

Some of the most comprehensive studies on identifying and assessing subsidies and other incentives harmful to the environment (e.g. environmentally harmful subsidies, EHS or, more specific, to biodiversity, BHS, which are a subset of EHS), at the national level were undertaken and compiled by the OECD. Matthews and Karousakis (2022) identified 23 national-level studies that aim to identify and assess subsidies and other incentives that are harmful to biodiversity and the environment. The studies span 12 countries (Austria, Denmark, Finland, France, Germany, Ireland, Italy, Lithuania, the Netherlands, Norway, Sweden and Switzerland) and two regions (Nordic and EU). Most of them examine environmentally harmful subsidies in general; 8 focus specifically on biodiversity.

The studies vary in terms of:

- sectors covered (nearly all studies cover agriculture and fisheries sector, and many cover transport and tourism, among others)
- types of subsidies and other incentives that are included in the scope; and
- approaches used in various steps of the analysis (e.g., desk research, surveys and interviews, workshops).

The OECD (2021a) assesses that globally, there are more than USD 800 billion of environmentally harmful and market distorting government support per year, while the total global finance for biodiversity amounted to USD 78-91 billion per year (2015-2017 average).

Matthews and Karousakis (2022) highlighted four steps to identify and assess incentives harmful to biodiversity at national level, which is the first step to achieve action on target 18:

- Scoping, to define the types of subsidies and other incentives harmful to biodiversity to be covered
- Screening, to identify the subsidies and other incentives potentially harmful to biodiversity
- Data gathering; and
- Assessing the extent of harm to biodiversity.

At the same time however, there also is significant scope to scale up incentives positive for biodiversity. As the following Fig. 1.1 shows, environmentally motivated subsidies, for example, are only known from less than 30 countries. Biodiversity-relevant tax revenues make up USD 7.7 bn / year in OECD countries, which is less than 1% of all environmentally-related tax revenues.

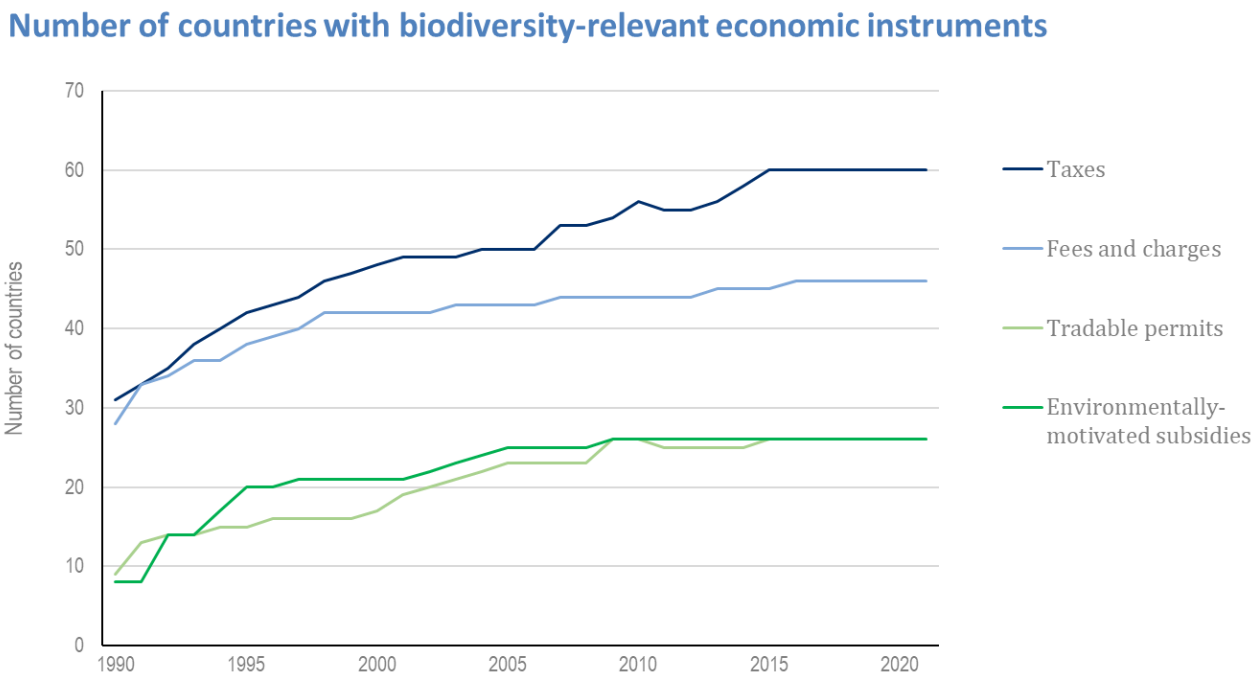


Fig. 1.1: Number of countries with biodiversity-relevant economic instruments, by type. Source: OECD (2021a, 2021b).

1.3 The Example of Italy (Aldo Ravazzi Douvan, Italian Ministry of Environment)

1.3.1 Background and History

Following the G20 Summit in Pittsburgh (2009) and the CBD Strategic plan (CBD 2010), Italy developed a Catalogue on Environmentally Harmful Subsidies (EHS) and Environmentally Friendly Subsidies (EFS) (MATTM 2016, MASE 2021, 2022). It represents an (annually evolving) knowledge platform at the service of:

- policy-makers (Parliament & Government);
- scientific community; and
- civil society.

First published in 2016 and now in its 5th edition (2022), it contributes with knowledge & know-how to G20 Peer Reviews on Fossil Fuel Subsidies (FFS), Apec FFS Peer Review, OECD FFS Inventory, Eurostat and UN-SDG statistics.

Fundamental issues in dealing with BHS

- **Subsidies Harmful to Biodiversity** (BHS) should be treated (analysed, estimated and prepared for phase-out or transformation in EFS, Environmentally Friendly Subsidies) consistently with the treatment of EHS & EFS, and FFS.
- **Subsidies** should be treated in the frame of an **EFR (Environmental**/Green/Ecological Tax/**Fiscal Reform):** shifting the tax burden from labour and firms income to pollution, Greenhouse gas (GHG) emissions and the use of natural resources.
- An EFR should be **fiscally neutral** from the point of view of revenue, but this may be interpreted in different ways in times of increasing taxes (e.g. high cumulated public debt - Next Generation EU & National Recovery and Resilience Plan reimbursement) or in times of abating taxes (aim of various political parties in Europe).

What still needs to be discussed is whether there should be **one** strong symbolic measure (e.g. a carbon tax or a plastic tax) or an **EFR** package, and whether this should be done in the framework of a GTR (General Tax Reform) or independently.

The idea of eliminating environmentally harmful subsidies (or 'perverse' or 'néfastes', as defined by some American and French experts respectively) fits rightly in the framework of an Ecological Tax Reform, developed and promoted by international organisations such as the OECD or academics as von Weizsäcker and Jesinghaus (1992) since the early 1990s.

According to the Italian Catalogue on Environmentally Harmful Subsidies and Environmentally Friendly Subsidies (MATTM 2016, MASE 2021, 2022 – Executive Summary), there are several definitions for subsidies. The World Trade Organisation (WTO) defines them as 'a monetary transfer from the State to a private entity'; OECD as 'the result of a government action that generates an advantage for certain producers (consumers) with the aim of reducing their costs (increase their income)' and the International Monetary Fund (IMF) as the difference between the observed (market) price and the marginal social cost of a production, which internalizes the social damage'. Italian law-makers say that 'subsidies are to be taken in their widest possible definition and comprehend, inter alia, incentives, tax expenditures, favourable loans, tax

exemptions' (Italian Parliament (2015)). Based on this, the Italian catalogue approach defines them as 'A measure that keeps consumer prices underneath market level and producer prices above market level, or reduces costs for producers and consumers, via direct or indirect support'.

1.3.2 The situation in Italy

The following tables (Tab. 1.1 and 1.2) and Fig. 1.2 give an overview of EHS/EFS, of BHS and BFS (Subsidies friendly to biodiversity) and of the 10 most important EHS in Italy.

Tab. 1.1: Estimates of Environmentally Harmful Subsidies (EHS) and Environmentally Friendly Subsidies (EFS) in Italy, 2016-2020

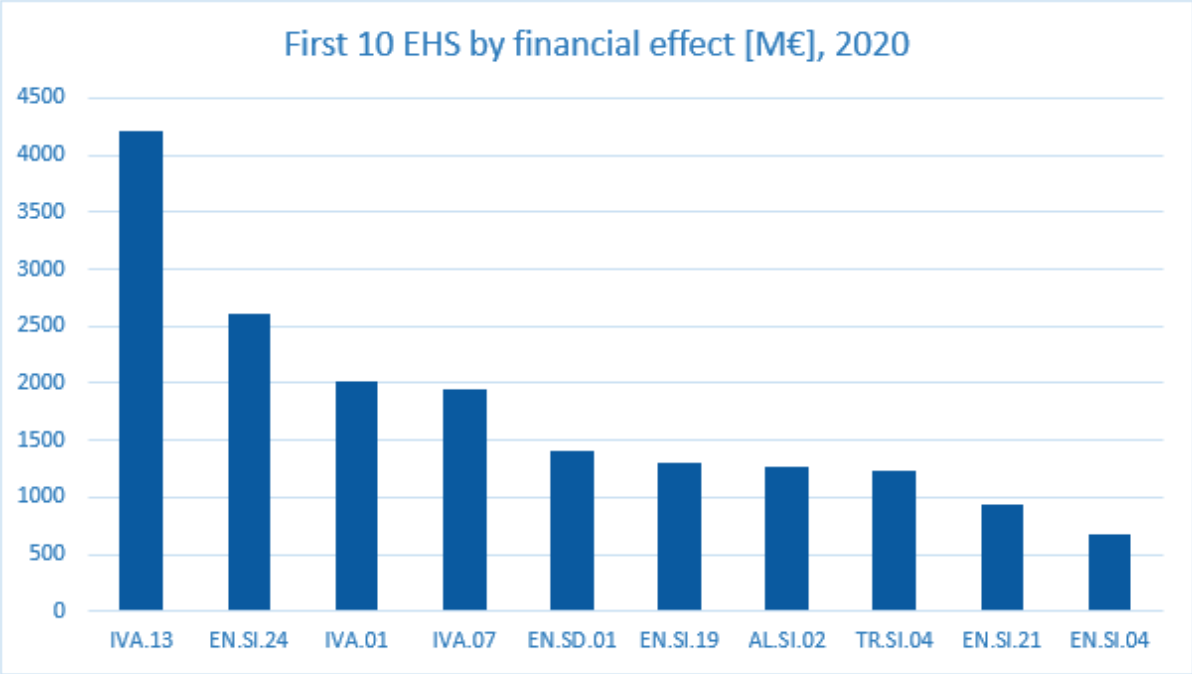
Year of Evaluation	2016		2017		2018		2019		2020	
	n.	estimate (M€)	n.	estimate (M€)	n.	estimate (M€)	n.	estimate (M€)	n.	estimate (M€)
EHS	57	20,337.95	58	22,216.99	61	23,032.04	61	24,530.65	60	21,648.63
of which FFS	39	12,665.14	41	13,578.52	41	14,295.23	41	15,014.65	40	13,060.21
Uncertain	33	8,445.46	35	9,478.16	35	11,217.60	35	12,874.58	35	13,630.05
EFS	59	16,185.18	62	16,695.92	68	17,089.71	78	17,600.51	85	18,923.46
Total	**149**	**44,978.59**	**155**	**48,391.08**	**164**	**51,339.36**	**174**	**55,005.73**	**180**	**54,202.14**

Source: MASE (2021).

Tab. 1.2: Subsidies harmful to Biodiversity (BHS) and Subsidies friendly to Biodiversity- (BFS) in Italy

Year	2019		2020	
	n.	estimate (B€)	n.	estimate (B€)
BHS	101	37.93	103	36.17
BFS	55	16.42	61	17.34
Uncertain	18	0.65	16	0.69
Total	**174**	**55.00**	**180**	**54.20**

Source: MASE (2021). Note: The fourth edition of the catalogue featured the introduction of an assessment of EHS that specifically considers the damage done to nature, ecosystems and biodiversity referred to here as BHS. The two approaches present in some cases conflictual positions in evaluation that are still to be addressed.



Abbreviation	Name of Subsidy (EHS)	Effect (M€)
IVA.13	VAT rebate on the purchase of new houses (non-luxury) (10% vs. 22%)	4,203.89
EN.SI.24	Difference in treatment of gasoline and diesel	2,610.68
IVA.01	VAT rebate on the purchase of new and first houses (non-luxury) (4% vs. 22%)	2,012.91
IVA.07	VAT rebate on energy for domestic use (10% vs. 22%)	1,944.06
EN.SD.01	Free ETS (Emissions Trading System) allowances	1,402.03
EN.SI.19	Reimbursement of extra diesel costs for transporters (commodities & persons)	1,293.81
AL.SI.02	Tax credit for the purchase of capital goods in low-income regions in South Italy	1,266.7
TR.SI.04	Tax deductions on fringe benefits for company car use by managers & employees	1,231
EN.SI.21	Tax rebates on the use of energy products in agriculture and ancillary works	942.72
EN.SI.04	Excise duty exemption on line airplane fuels	682.27

Fig. 1.2: The most important Environmentally Harmful Subsidies (EHS) in Italy by financial effect in 2020 (in M €). Source: MASE (2021).

To better understand the results presented in Tab. 1.1, Tab. 1.2 and Fig. 1.2, it is worth noting that in Italy:

- Implicit tax rates on energy are the highest in Europe (not surprising in absence of significant national fossil fuel production).
- Italy places fourth for fiscal coverage of emissions and second for average 'shadow' (implicit) price for CO_2 in Europe.
- More than 90% of EHS is made up of tax expenditures introduced with the aim of social solidarity or national competitivity (there are other direct & transparent tools for solidarity & competitiveness better than underpricing environment)
- CITE (Interministerial Committee for Ecological Transition) has announced in Feb.2022 a proposal by June 2022 for the progressive phase-out of EHS with time horizon 2022-2026 (MASE 2021, 2022).

Resulting from the catalogue, 5 'low-hanging fruits' of EHS were cancelled in January 2022, adding up to 108 Million € in 2020 (Tab. 1.3):

Tab. 1.3: The 5 'low-hanging fruits' of EHS in Italy that were cancelled in January 2022

Code	Title	Financial effect [M€]		
		2018	2019	2020
EN.SI.06	Excise duty reduction for fuels used in rail transport (people and commodities)	22.90	25.80	22.40
EN.SI.14	Excise duty exemption for energy products used in the production of sea water magnesium	0.50	0.50	0.50
EN.SI.25	Excise duty reduction for energy products used by ships in transhipment harbour maneouvre	1.80	1.80	1.80
EN.SI.28	R&D fund for coal projects	0.00	0.00	0.00
EN.SI.13a	R&D fund for oil projects	42.70	42.37	43.37
EN.SI.13b	R&D fund for gas projects	40.67	41.00	41.00

Source: MASE (2021, 2022). Note: No financial effect occurs for R&D fund of coal projects, because the measure existed in the budget but had no appropriations in the 3 years and coal is still used in 2 Enel coal plants to be closed by 2025-27.

For the new editions of the Catalogue (MASE 2021, 2022) major challenges will be how to treat emergency subsidies. Due to recent international events, such as the Covid crisis, the aggression of Ukraine by Russia and the consequent energy prices' increase, many emergency subsidies have been adopted, rapidly changing and exceptional by their nature.

1.4 The Situation in France (Vincent Marcus and Anca Voia, French Ministry of Ecological Transition)

1.4.1 Biodiversity Harmful Subsidies: Where does France stand now?

The cornerstone of work on subsidies harmful to biodiversity in France was the seminal work 'Public subsidies harmful to biodiversity' by Sainteny (2011), a very comprehensive, rather qualitative analysis, followed by minor reforms (e.g. air pollution taxation).

Since 2021 a 'Green Budget' (French Government 2022) is in place to complement the annual fiscal bill. In the French Green Budget, each budgetary expense is tagged as favourable, unfavourable, mixed, neutral, or is not tagged with regard to its impact on 6 environmental objectives, that correspond to the 6 axes of the European taxonomy for the classification of sustainable economic activities: climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, as well as protection and restoration of biodiversity and ecosystems. For example, in the 2022 French Green Budget, 12.5 bn€ were identified as being favourable to biodiversity (including indirect impacts), while 4.9 bn€[1] were identified as being harmful to biodiversity, mainly made up of budget spending to finance new transport infrastructure, tax spending for housing access and reduced domestic consumption tax rates for biofuels.

Following the adoption of the KMGBF (CBD 2022) in December 2022, France adopted in November 2023 its second chapter of the National Biodiversity Strategy (NBS) for 2030 (French Ministry of Ecological Transition 2023a) with a strong commitment to identify and reduce BHS with an appropriate and progressive planning.

France has also launched an audit report in early 2023 on how to finance the new National Biodiversity Strategy. This audit report (Dumoulin et al. 2023) provides an overview of biodiversity harmful subsidies, but uses a different perimeter and methodological approach than the French Green Budget, leading to slightly different results. By analyzing the French state budget in 2022 (570 bn€), the audit report classifies 4.6 bn€ as favourable to biodiversity (including biodiversity-related policies that reduce the pressures on it) and approximately 3.7 bn€ as subsidies harmful for biodiversity, such as: national agriculture and fisheries support, new transport infrastructure, housing support, urban development, biofuels, print paper press. In its overview of subsidies harmful to biodiversity, the audit report also includes the EU Common Agriculture Policy -CAP (first pillar- direct payments) subsidies[2] for an amount of 6.5 bn€[3]. Fig. 1.3 below presents an overview of these subsidies harmful for biodiversity and their amounts for the year 2022.

[1] In 2023, the amount of biodiversity harmful public spending is 2.6 bn€ as with new information available, some expenses changed tagging and became neutral (while they were considered as unfavourable in 2022).

[2] EU subsidies are not included in the official French Green Budget which only tags state expenditures.

[3] It should be noted that this classification of biodiversity harmful subsidies is not an official position of the French government at this stage.

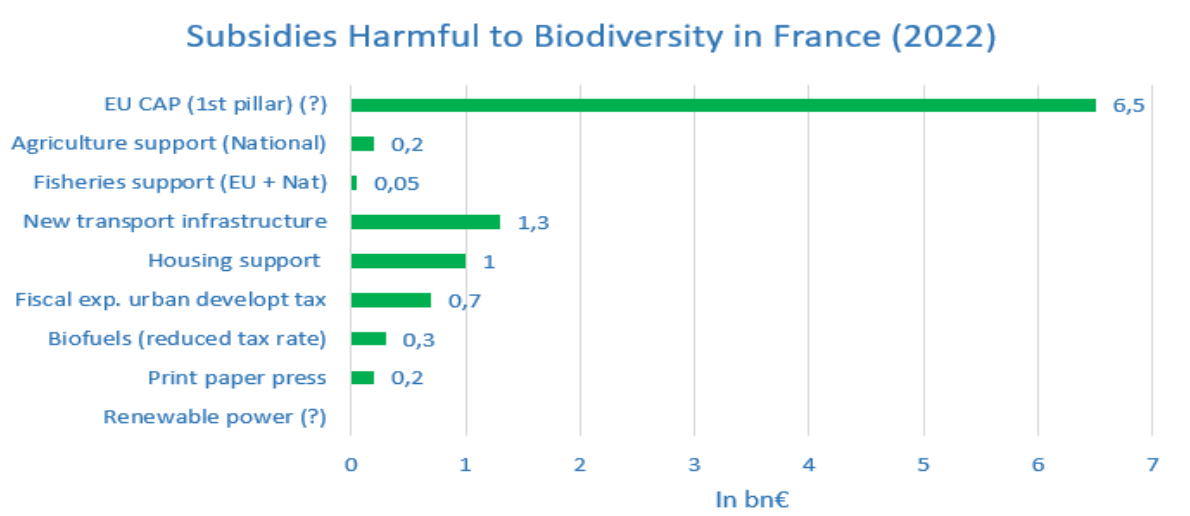


Fig. 1.3: Subsidies harmful to biodiversity in France in 2022. (?) is used to represent the uncertainty related to the classification of the expenses as harmful to biodiversity. Source: Audit Report (Dumoulin et al. 2023).

1.4.2 Some examples on how to potentially reform subsidies harmful to biodiversity identified by the audit report (Dumoulin et al. 2023):

Agriculture is one of the major pressures on biodiversity (e.g. through pesticides and fertilizers use). The EU CAP '1st pillar' (direct payments) is regarded as harmful, as providing no incentives to change practices (income transfer with no conditions, or not binding). This assessment is to be updated for the next CAP 2023-2027 as 25% of direct payments (=1.7 bn€) are now submitted to environmental conditions, alternatively through practices such as crop rotation, grass land conservation, etc. and certification (e.g., organic, high environmental value).

New **transport** infrastructures (road, railway, waterway) cause land use change and generally destroy habitats and ecosystems, and may also create barriers in ecological corridors. However, out of 1.3bn€s, around 50% are directed towards the construction or maintenance of railway or waterway infrastructure, assumed to contribute to climate change mitigation goals. Thus, these expenses are challenging to reform, but there are at least two main ways forward: (i) limit the construction of new roads and (ii) reduce the negative impacts on biodiversity of all new infrastructure or compensate for these effects, if the reduction is not possible, following the hierarchical sequence 'avoid, reduce and compensate' defined by the French Ministry of Ecological Transition (2023b).

In terms of **housing support**, two major **fiscal schemes** are relevant, as they cause urban sprawling to a certain extent (national estimates find that around 20% of apartment buildings and 60% of new individual houses induce urban sprawl): the fiscal reduction for investors in new housing for rent (Pinel scheme) and the zero-interest loan for housing purchases (generally individual houses). There are several ways to reform these fiscal schemes: the Government can remove them, as it will be the case in France for the Pinel scheme after 2024 or they can impose some eligibility restrictions in order to reduce the land take of new constructions (for example, a planned reform of the zero-interest loan, as the scheme can only be available for new apartment buildings in tense areas or for old houses subject to renovation).

For each new construction an **'urban development tax'** has to be paid to the municipality to finance infrastructure. However, the high number of rebates reduce the tax's return and its

incentive effect to lower urban sprawl. These rebates could therefore usefully be abolished or reduced. For example, the first 100 m^2 of individual houses benefit from a 50% rebate (and a full exemption if benefiting from zero-interest loan). Removing this rebate could provide a substantial amount of money (400 M€), while only having minor effects on the construction costs (+1-3 % of total construction costs).

The impact of the **support to printed press** is expected to be reduced in the coming years with several new regulatory requirements: plastic wrap ban, increasing rate of recycled paper use and the transition to mineral oils free inks.

There is an ongoing analysis on the rating of the **support to renewable power**, today classified as neutral, due to different impacts among renewable energy sources. The main issues encountered are (i) the choice of the right counterfactual scenario (stand alone, among renewables, vs. nuclear plant) and (ii) the poorly documented comparative pressure induced on the resource and life cycle ecosystems.

1.4.3 Challenges and ways forward for policy reforms

It is not easy to find a substantial amount of subsidies harmful to biodiversity that can be reformed, as some are partially out of national scope and happening at EU level, while others have mixed effects (e.g., climate change mitigation vs. biodiversity).

A strategy for reform raises the question: Is it better to reduce the amount of money spent on the incentives or to change the purpose of the subsidies in order reduce their impacts?

A possible strategy would be to:

1. reduce the Euro where there are clear incentives effects and behavioural impacts
2. keep the Euro but reduce the impact (through other instruments)
3. indirect channel: reduce the Euro (with no impact and use it to do something with positive impact

1.5 The Example of Germany (Kai Schlegelmilch, German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection)[4]

Preliminary remarks: It is important to note that all energy/climate related measures also have generally positive impacts on biodiversity, as they contribute to reducing the climate crisis, which has a large and growing impact on biodiversity. Yet, implementing the energy transition can also have severe negative impacts on biodiversity, mostly depending on the local circumstances. Hence, a balanced approach must be pursued.

[4] Disclaimer: The publication is on a personal basis, but mostly in accordance with the Government line.

1.5.1 Already reduced Environmentally Harmful Subsidies

Germany has already reduced a number of environmentally harmful subsidies. The following steps have been taken so far (UBA 2021; German Federal Government 2023, FÖS 2024):

- Environmental Tax Reform (1999-2003)
- Implementation of the EU – Energy Tax Directive 2004
- Heavy Goods Vehicle Charge (HGV Charge) 2005
- Abolition of the home owner support 2006
- Air ticket tax 2011
- Nuclear fuel tax 2011 (2016 abolished/repaid)
- Extension of the HGV Charge 2014
- Phase out of hard coal subsidies 2018
- CO_2 Pricing 2021
- HGV Charge: 2023 increase
- Common Agricultural Policy (CAP) 2023: More than 50% of payments are now linked to environmental/biodiversity criteria
- 2024: Extension of the EU ETS from 40% to 80% of greenhouse gas emissions.

1.5.2 The Government Coalition recently agreed on the following measures

(German Federal Government Coalition Committee 2023)

- **Transport fuel taxation** should be oriented more towards its environmental and climate impact.
- The **HGV Charge** should already be applied from 3.5 tons from 2024 onwards – crafts companies excluded.
- **Railways** should get 45 bn€ for investments until 2027, financed i.a. through a CO2-supplement on the HGV charge which should be 200 €/t CO2. Zero emission lorries should be exempted until the end of 2025 and afterwards pay only 25%.
- **Public peoples' local transport** – particularly in rural areas – and bike paths should be extended. Alternative motors of railways should receive support.
- **Synthetic fuels** (E-Fuels) should be used more intensively and should be incentivized in the short term. The agreement between the current German Government and the EU-Commission is to also allow new cars with combustion engine beyond 2035, if run only on e-fuels.
- **More investment should be made for railways than for roads.** For roads the focus should be on maintenance and sanitation, e.g. for old bridges. For some road projects (144 in total) the current German Government will claim their 'overwhelming public interest'. This should abolish congestion spots and bottlenecks.

On 15.11.2023 the Federal Constitutional Court judged that the Second Supplementary Budget Act 2021 is void (BVerfG 15.11.2023), which means that the government has to finance its budget differently than initially decided. This led to several Government decisions (German

Federal Government 2023b and 2024a) at the turn of the year 2023/2024 which comprise several first steps towards reform/phase out of environmentally harmful subsidies as agreed in the Coalition Treaty 2021-2025 (Coalition Treaty 2021). Mainly in this context, the following mostly progressive[5] elements were politically agreed:

From 2023, the already mentioned **Heavy Goods Vehicle (HGV) Charge** also applies to vehicles from 3.5t on already (instead of previously from 7.5t). Additionally, since July 2024, by varying the toll rates according to the amount of pollutants and CO_2 the vehicles emit, the tolling scheme also provides transport companies with an incentive to efficiently deploy fewer polluting vehicles and supports a modal shift of freight traffic to the rail and waterway modes (BMDV 2024).

Carbon price is readjusted/increased from 30 € to 45 € per ton of CO_2 from 1.1. 2024 (and a further increase by 5€ p.a. until 2026) (German Federal Government 2024b). The **air ticket tax** is increased from 2024 on (and will no longer be adjusted) to the price used in the EU Emissions trading scheme (ETS). So far, the ETS price led to a reduction of the air ticket tax. In 2024, additional revenues of up to 70 M€. will be generated, and up to 300 M€ from 2025. In addition, it will be adjusted yearly in such a way that additional revenues are generated which equals the amount that is lost through the non-taxation of kerosene for domestic flights. This will lead to additional revenues of up to 580 M€ in 2024 (Kai Schlegelmilch, personal communication 2024).

Additional revenues of up to 1.4 billion € p.a. will be generated through the implementation of a **plastic tax** from 2025 on (German Federal Government 2024a; Kai Schlegelmilch, personal communication 2024). This EU-wide tax was previously paid by the government and will be paid in future by the producers, as the German government has now decided.

The tax subsidy for agricultural diesel will be phased out within three years until end 2026, when up to 440 M€ will be generated by the German Government (German Federal Government 2024a; Kai Schlegemilch, personal communication 2024).

1.5.3 In 2019, a study from the Federal Agency for Nature Conservation (BfN) identified the following Biodiversity Harmful Subsidies in Germany:

Box 1 below shows some selected subsidies harmful to biodiversity in Germany, based on the position paper on the 'Reduction of environmentally harmful subsidies and compensatory payments for agricultural pollutants' by the German Federal Agency for Nature Conservation (BfN) (BfN 2019). Based on this study, a number of compensation payments for physical impacts of non-internalised external costs (in billion € p.a.) were suggested:

- For excessive use of fertilizers, a nitrogen surplus charge should be introduced to reduce the negative external effects of agriculture and to compensate for them.
- For excessive use of pesticides: based on the positive experiences in Norway and Denmark, a risk class differentiated charge should be introduced.
- Revenues of such compensation payments should be used for recycling into the agricultural sector, targeted measures in particularly sensitive areas and increasing acceptance for such compensation payments.

[5] Progressive is used here in its fiscal meaning, to express that taxes increase more than linear when the tax base increases.

Box 1: Subsidies Harmful to Biodiversity and climate in Germany (BfN 2019):

- Housing and Transport 8.6 bn €

  e.g. Commuting lump sum income tax reduction; Tax subsidy for diesel (18 €-Cents/liter tax differential)

- Agriculture and bio-energy 13.5 bn €

  e.g. Direct payments of the EU Common Agricultural Policy (CAP 2014-2020); Value Added Tax Reduction for animal products (meat, milk)

- (Further) harmful subsidies for the climate in the energy sector 33.0 bn €

  e.g. Many energy tax reductions for several sectors; Lower energy rates for most polluting fossil fuels

Total sum (at least) **55.1 bn €**

1.5.4 Conclusions

Despite several changes in subsidies towards more sustainability, **subsidies harmful to the environment amount to at least 55 billion €** in Germany.

Compensation payments for the excessive use of fertilizers and pesticides should be introduced (providing more than 2 billion € of revenues) according to the 2019 study. Already a very minor part of the 55.1 bn € of additional revenues would be sufficient for upscaling public biodiversity expenditures and thus, substantially for meeting objectives positive for biodiversity (1.4 billion € are needed, currently 0.6 billion € are available, gap: 0.8 billion €).

In order to reduce biodiversity harmful subsidies,

1. courageous politicians and persistent politically and strategically thinking and acting administrators are necessary.
2. regular monitoring and reporting such as in various governmental reports like the bi-annual subsidy report with sustainable impact assessments (by the BMF 2021 and BMF 2023), complementary reports (as by BfN 2019 and UBA 2021, the German Environment Agency) and correction of subsidies are crucial.
3. using ongoing political processes, particularly budget (biodiversity and climate) discussions and the yearly budget planning to integrate subsidy reforms, as a platform is advantageous.
4. forming alliances with potential winners of such reforms such as the Ministry of Finance, but also companies and other stakeholders is needed.
5. appropriate communication to support subsidy reforms needs to take place.
6. targeting current and later environmentally support measures ('green recovery') is the chance of the crisis for the acceleration of the ecological transition. The EU Green Deal and many studies point at such chances frequently.

1.6 Résumé and Outlook

The amount of money spent on subsidies harmful for biodiversity globally and in Italy, France, Germany (see previous chapters) and Switzerland (see Gubler et al. (2020)) is considerable (see Tab. 1.4 for summary). Subsidies harmful for biodiversity are 4-92 times as high as money spent for biodiversity.

Tab. 1.4: Comparison of estimates for Biodiversity harmful subsidies and expenditures for biodiversity Switzerland and its neighbouring countries (2020 or most recent available year)[6]. Source: own representation based on previous chapters

	Italy (bn€)	France (bn€)	Germany (bn€)	Switzerland (bnCHF)
Subsidies harmful to Biodiversity/Nature **(A)**	36.2	10.2	55.1	40.0
Expenditures for biodiversity **(B)**	1.1	2.3	0.6	0.5
Ratio (A/B)	**32.09**	**4.4**	**91.83**	**80**

Assessments on the volume of BHS have been undertaken in all of the countries presented, and likewise, a small to medium number of steps have also been undertaken to abolish these subsidies. However, political and technical obstacles remain; furthermore, in the EU member states, some of these incentives are at the EU level and need to be tackled there. The results presented show: while there is commendable progress especially in the identification of subsidies harmful for biodiversity, there is also still considerable work to be done to eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, by 2030.

The original presentations can be downloaded at https://iucn.ch/11-mai-2023-tagung-ueber-biodiversitaetsschaedigende-anreize/.

[6] Numbers and comparability in this table must be treated with caution as the methodology may be a bit different from country to country. The amount of biodiversity harmful subsidies (line A) for France includes only harmful subsidies with a direct impact on biodiversity and thus, does not include climate harmful subsidies that have only an indirect impact on biodiversity. However, it seems that the amount of harmful subsidies in other countries (e.g. Germany) also includes climate harmful subsidies. Likewise, the numbers for money that is spent for biodiversity (line B) may be different in scope. In France, 2.3 bn€ represent the direct expenditures for biodiversity policies in France. If one also includes biodiversity-related policies that reduce the pressures on biodiversity, the total amount of favourable expenditures is 4.6 bn€. Nevertheless, these numbers clearly indicate that the amount of money spent for subsidies which damage biodiversity is considerably higher than the money that spent for biodiversity in all countries assessed.

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2 Biodiversity damaging subsidies in Switzerland – an overview

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Abstract

Through Aichi Target 3, all signatory states of the Biodiversity Convention were committed to eliminate, phase out or minimize biodiversity damaging subsidies by 2020. None of the signatory states has achieved this goal. It has therefore been again included in the Kunming-Montreal Agreement of 2022, in Target 18. Switzerland has included the intention of the Aichi Target 3 in its national biodiversity strategy (Bundesblatt, 2012). In 2020, a study was published by the Federal Research Institute for Forest, Snow and Landscape (WSL) that provides a broad overview of subsidies with negative effects on biodiversity (Gubler et al., 2020). The assessment covers subsidies of the following areas: transport; agriculture; forestry; settlement development; energy production and consumption; tourism; flood protection and wastewater disposal. The study is based on a broad understanding of the term subsidy, which also includes tax reductions and non-internalised external costs. The 162 subsidies identified were then categorised and assessed in terms of their level of damage. In 2022, the Federal Office for the Environment (FOEN) prioritized, based on the WSL study, eight subsidies. The relevant federal offices are now commissioned to examine the impact of these eight subsidies on biodiversity more deeply and to submit proposals for their reform by 2024. Beside targeting single subsidies, another way to minimise the negative effects on biodiversity would be to include biodiversity and environmental goals in the process of subsidy allocation or in the general increase of policy coherence between the individual sectoral policies.

Gubler et al. (2020) of the Swiss Federal Research Institute for Forest, Snow and Landscape (WSL) identified more than 160 subsidies with biodiversity-damaging effects. These subsidies are not only harmful to biodiversity but also economically inefficient, because public budgets are charged several times. In addition to the costs of the financial contributions themselves or the revenue loss due to tax breaks, the subsidies cause damage costs that again have to be covered by public funds, e.g. for repair measures.

As such a broad inquiry into biodiversity damaging subsidies is rather rare, this article presents the methods and findings of the study and discusses possible approaches of reforms.

2.1 Definition of subsidies

Neither in economics nor in financial science the term subsidy is uniformly defined. The definition depends rather on the perspective of the object of study. Thus, there are many different definitions of the term. The definition of biodiversity damaging subsidies in the WSL-study uses a broad understanding of the term subsidy, based on the definition of the OECD:

"Subsidies are government measures that provide an advantage to consumers or producers in order to increase their income or reduce their costs." (OECD, 2005)

In addition to on-budget subsidies (such as compensations, à fond perdu contributions, grants), this also includes off-budget subsidies (e.g. tax breaks) and implicit subsidies (non-internalised external costs, cross-subsidisation, etc.).

Subsidies are important financial policy instruments to achieve political goals. However, the use of subsidies may have side effects with negative impacts such as biodiversity-damaging subsidies. Such negative effects manifest themselves for example in increased fragmentation, pollution or disturbance of habitats through material inputs, light and noise, or in loss of habitats due to sealing or overexploitation of resources. Thus, biodiversity-damaging subsidies can be described as follows:

"Biodiversity damaging subsidies benefit production or consumption and thus increase the use of natural resources; they lead to pollution, disturbance and loss of habitats and of their species and diversity." (after Valsecchi et al., 2009).

2.2 Negative effects of subsidies on biodiversity

The degree of negative impacts on biodiversity depends on various factors: on the size of the affected area, on the amount of the subsidy, on the intended duration of the subsidy (does it expire or is it open-ended?), on the hitherto duration and also on the vulnerability of the habitats and/or species affected (how well can they adapt or escape?). The underlying (often indirect) cause-effect relationships can hardly be quantified, nor can they be measured precisely. Hence, science tends to refrain from making statements about the interrelationships between subsidies and biodiversity damaging effects or it isolates partial aspects to a degree that disregards many other impact-chains and thus does not capture the full picture of damage.

Hence, this assessment of the negative impacts in this study had to be based on expert interviews. Due to the missing scientific evidence and the indirect or delayed impact correlations, the assessment of the negative impact of the investigated subsidies tended to be very conservatively.

2.3 Call for abolition and reform of biodiversity damaging subsidies

The claim that biodiversity damaging subsidies should be abolished is not new: the OECD has been calling for this since the 1990s - at that time with a focus on environmentally harmful subsidies (OECD, 1998). The Convention on Biological Diversity (CBD) then committed its signatory countries to abolish, phase out or reform biodiversity damaging subsidies by 2020 under Aichi Target 3. In the Swiss Biodiversity Strategy 2012, the Federal Council also set the goal by 2020 of 'gradually eliminating or redesigning harmful incentives, including subsidies, in order to reduce negative impacts to a minimum or avoid them'. This goal, however, was not achieved by any of the signatory countries of the CBD. Therefore,in the Kunming-Montreal Agreement of 2022, the reform of biodiversity damaging subsidies is addressed again by Target 18. In Europe, a few countries have assessed their subsidies with biodiversity damaging effects. In 2011, France published a comprehensive report examining national subsidies with negative impact on biodiversity (Sainteny, 2011). The Italian ministry of the environment and energy security has published its 5th report on biodiversity damaging subsidies in 2022, which also includes subsidies with biodiversity-promoting effects (SVI, 2022). In its generic subsidy report, Germany describes the impact of each of its subsidies on sustainability in a broad sense (Bundesministerium der Finanzen, 2021). Moreover, the German Federal Environment Agency publishes reports at irregular intervals that examine the environmental impact of subsidies (Köder & Burger, 2016). In addition, the Forum Ökologisch-Soziale Marktwirtschaft (FOES) has published a report that focuses specifically on biodiversity damaging subsidies in Germany (see page 34- 47 in this issue, Zerzawy et al., 2021). An overview of existing studies can also be found in article 1 in this issue (see page 7-23).

2.4 Method: Identifying and categorizing biodiversity damaging subsidies

In order to identify subsidies with a negative impact on biodiversity, the first step in Gubler et al. (2020) was to examine the state of biodiversity of relevant habitat types through expert workshops and literature review (see Fig. 2.1, point a). Next, the drivers responsible for the poor condition of habitats (i.e. pollution, overuse, fragmentation, loss) were compiled and then checked for possible subsidies. If the drivers were found not to be subsidised, they were excluded from the study (for example invasive neobiota).

Once subsidies were identified, they were categorised as either (a) completely damaging to biodiversity, (b) partially damaging, or (c) as damaging depending on the implementation of the subsidised activity. Another categorisation of the subsidies was the political level of responsibility of the subsidy allocation: federal subsidies were systematically examined, while cantonal and municipal subsidies were only included in the compilation by means of examples.

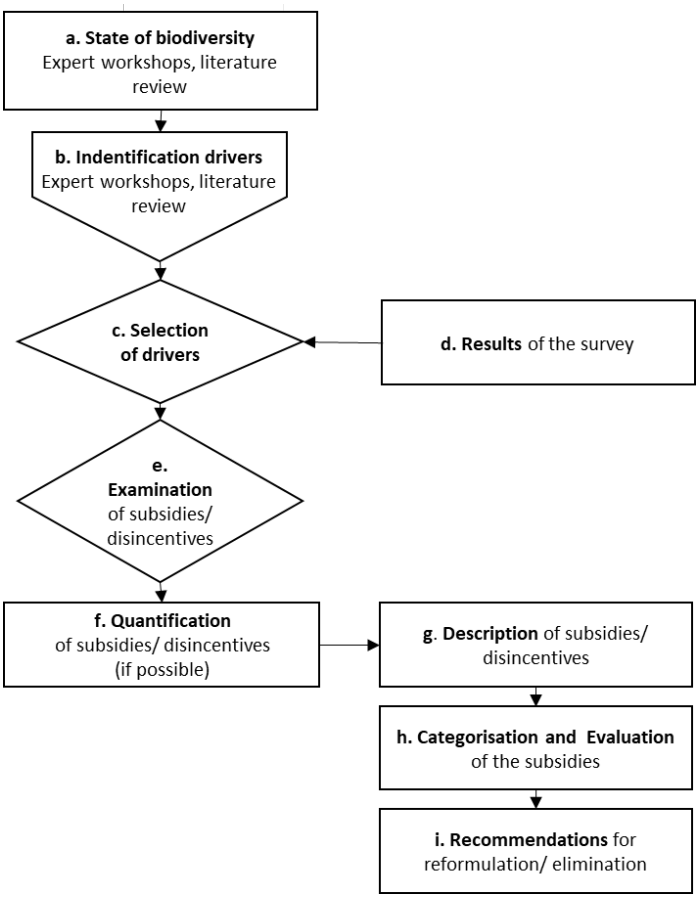

Fig. 2.1: Schematic description of the methodological procedure for identifying biodiversity-damaging subsidies. (own representation)

In a nationwide survey, interested citizens were asked to contribute to the investigation by reporting biodiversity damaging subsidies in their canton or municipality (the aim was to identify subsidies from lower political levels). The reported subsidies were checked and, if confirmed, included in the compilation. All subsidies were assessed by experts in terms of their negative impacts on biodiversity. Where possible, the amount of the subsidy was quantified. Options for reform were formulated without checking their political feasibility. In general, there are subsidies, mostly of the category 'completely damaging', that are recommended for abolition. This would not least relieve the state budget. However, in other cases the condition without subsidy would not necessarily be better for biodiversity – then it is recommended that biodiversity criteria are linked to the subsidy allocation (for example, for subsidies that are harmful to biodiversity depending on their implementation). This could even increase government spending. The study, however, does not make any statements on concrete budget allocations within and for individual sectors.

The following eight areas were examined: transport by road, rail and air; agriculture; forestry; settlement development; energy production and consumption; tourism; flood protection and wastewater disposal.

2.5 Results of the study

The study identified 162 subsidies with potential damaging impacts on biodiversity. These subsidies are granted in eight different areas. The largest shares are granted in the areas of transport, agriculture, energy and settlement development (see Fig. 2.2). For about one third of all subsidies, an internal conflict between ecological goals was identified: the goal of the subsidy is to protect the environment or nature, but the subsidised activity has side-effects that are harmful to biodiversity. One example is hydropower, which replaces fossil fuels but at the same time harms aquatic biodiversity by fragmenting water bodies and thus disrupting their continuity and sediment dynamics.

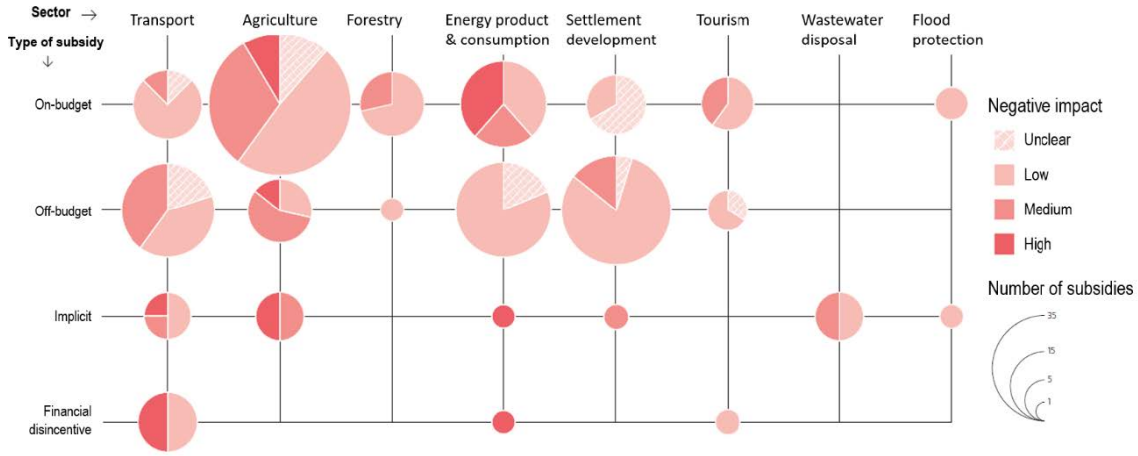

Fig. 2.2: Overview of identified subsidies with a negative impact on biodiversity in the eight areas investigated (Gubler et al. 2020; graphic: 1 kilo)

Tab. 2.1 gives some examples of biodiversity damaging subsidies. A full comprehension of identified subsidies can be found at subventionen.wsl.ch, where they can be filtered by various criteria (German only).

Tab. 2.1: Some examples of biodiversity damaging subsidies in selected sectors and according to subsidy type: on-budget subsidies: direct money-transfer such as compensations, contributions, grants; off-budget subsidies: revenue loss due to tax breaks and implicit subsidies: i.e. non-internalised external costs, cross-subsidisation, etc.

Sector	On-budget	Off-budget	Implicit
Transport	• Public expenditures for construction, expansion of roads • Federal funding from special financing of air traffic • Funding for electromobility	• Emissions tax: exemption from CO2 levy for fuels • Energy tax: reduction of the mineral oil tax • Air traffic: exemption from mineral oil tax for aviation fuels, VAT exemption for internat. air traffic	• External costs: air-, rail- and road traffic • Transport charge: flat rate charge for using national highways (regardless of distance)
Agriculture	• Promotion of sales of meat and eggs • 'Basic contribution' to agricultural land • Contributions for disposal of animal by-products • Contributions for structural improvements	• Exemption from performance-related heavy vehicle charge • Border control • Reimbursement of mineral oil tax • Vehicle tax reduction • Reduced VAT rate	• External ecological costs of nitrogen, phosphorus, pesticides, greenhouse gases • Insufficient consideration of biodiversity in agricultural consulting
Forestry	• Deficit guarantees • Forestry investment loans	• Reimbursement of mineral oil tax	• Insufficient consideration of biodiversity in forestry training
Settlement development	• Compensatory payment for high-altitude and small settlements • Compensatory payments for small, remote and sparsely populated communities	• Loans for infrastructure projects within the New Regional Policy (NRP) • VAT exemption • Tax deduction garden maintenance costs, maintenance costs	• Sale of municipal construction land below market value
Tourism	• Contributions for the Tourism Association Switzerland Tourism • Major sports events and tourism-related sports infrastructure • Tourism promotion under the NRP	• Loans for lodging industry • Reduced VAT rate for lodging industry • Reimbursement of mineral oil tax for snow groomers	
Energy	• Feed-in remuneration system for small-scale hydropower and wind power • Investment contributions for small-scale hydropower	• Exemption from CO2 levy for CHP plants (Combined Heat and Power) • Free allocation of emissions rights to refineries • Reimbursement of mineral oil tax and grid surcharge for oil refineries • Low liability cover for nuclear plants and water retaining facilities	• External costs of hydropower

2.6 Spendings that trigger more costs

Subsidies with biodiversity damaging effects are not only ecologically critical, they are also economically inefficient, because they can burden public budgets in several ways (Köder and Burger 2016, Gubler et al. 2020):

A. Firstly, the subsidies in the form of contributions, financial compensations or reduced tax revenues burden the federal, cantonal and/or municipal budgets

B. Secondly, public funds are subsequently needed to repair the damage caused by the subsidies. This can be at least two kinds of repair. For instance, a) eutrophied lakes must be artificially aerated or b) ecosystem services - so far free of cost - need to be replaced, e.g. water filtering of soil or pollination of insects.

C. Thirdly, biodiversity-friendly production methods need financial support in order to keep them marketable - in competition with the subsidised biodiversity-damaging production methods;

Two examples of economic-ecologically inefficient subsidies:

(1) While subsidised agricultural structural improvement removes ecologically valuable small structures from the cultivated land in order to facilitate the cultivation of this area (and thus achieve one of its subsidy objectives), biodiversity contributions are simultaneously granted somewhere else for the new creation of just such small structures in agricultural land.

(2) For renewable energies to be competitive with other energy sources, they are substantially supported by the public sector, instead of eliminating the subsidies on fossil energy sources to reflect their true price. The subsidies, thus, distort the market and - instead of an increasing price that should automatically result from the scarcity of resources -, they keep the price artificially low and thus leave resource consumption at a high level or even increase it.

2.7 Challenges for transforming subsidies

Why is it so difficult to abolish or reform subsidies? There are several reasons. Politically, it is more attractive for one's own electorate to award new subsidies, rather than to revoke existing subsidies or impose additional requirements. Additionally, often the beneficiaries from subsidies are better organised than those that would benefit from its abolition (these actors usually don't know about their benefits that would arise from the restructuring of the subsidy) (Köder and Burger 2016). For example, car drivers who benefit from tax breaks are better organised than all taxpayers, whose tax burden could be reduced by abolishing the car drivers tax breaks. Moreover, if a subsidy has been in place for a long time, such as fuel subsidies, it is perceived as a norm or even a right, and its removal may be interpreted as an encroachment on personal freedom. Another difficulty is, that the initial policy objective of a subsidy often concerns a different policy sector than the sectors affected by negative side effects of the subsidy in consideration. When the subsidy is reviewed to see if it achieves its intended purpose, the responsible sector comes up with a positive result; at the same time, environmental policy must provide proof that a negative side effect occurs as the result of a subsidy. Hence, were the environmental policy objectives already taken into account before allocating the subsidy, additional costs as downstream damage could have been avoided (Gubler et al. 2020).

2.8 Possible approaches for policy makers

Gubler et al. (2020) propose three general approaches to tackle the described obstacles in the transformation of subsidies: (i) increasing the policy coherence between the various policy sectors and their objectives, (ii) reforming the individual subsidies and (iii) adjusting the subsidy allocation process.

(i) Increasing policy coherence

The cross-sectoral nature of environmental problems and policy must be recognized by policy makers. This could favour a situation in which a damage was remedied by the policy sector who grants the subsidies (the problem would no longer be passed on to environmental policy). Hence, environmental goals would be better taken into account by the respective policy areas, when granting subsidies or when reviewing them in order to reduce conflicting objectives (e.g. between the objectives of a subsidy and overall environmental objectives). A possible starting point could be to align planning principles with environmental goals (e.g. transport planning principles that are aimed towards achieving biodiversity goals, soil goals, climate goals etc.).

(ii) Reforming individual subsidies

The reform of individual subsidies could be approached by prioritising them, while taking into account the degree of damage caused and/or the political feasibility of a reform. To increase the political feasibility of a subsidy reform, the benefits could first be identified. For instance, the potential to reduce the general tax burden, if the respective biodiversity damaging off-budget subsidy was removed. Unfortunately, in Switzerland the tax breaks are not listed and, hence, the sum involved is unknown. Consequently, control eludes the parliament. Estimates of 2009 and 2011 assume a revenue shortfall of 24-30 billion francs for the federal treasury due to tax concessions (out of a total revenue of 78 billion) (EFV, 2019). Also, due to the lack of data, it is not possible to determine what proportion of this estimated revenue loss has a biodiversity damaging effect.

(iii) Adjusting the subsidy allocation process

Another approach to facilitate subsidy reforms could be the inclusion of their impact on the environment and particular biodiversity in the regular review of subsidies at the federal level: Every six years, federal subsidies are reviewed by the respective offices with regard to various economic criteria and in accordance with the Subsidies Act. In this context, for example, the economic efficiency review of subsidies could also take the ecological costs into account. This would correct the cost-benefit ratio and favour a reform accordingly. A precondition is that the respective review body acquires or consults competences in the field of ecology. First steps are made in Switzerland. Recently, the guidelines for the review of federal subsidies were adapted and supplemented with the requirement that subsidies must be reviewed for externalities, which includes negative effects on biodiversity. However, so far, no subsidies have been reviewed according to these criteria, such that conclusions are yet to be drawn about the positive effects of this adjustment.

2.9 Outlook

Building on the study Gubler et al. (2020), the FOEN published a follow-up study in which the 162 subsidies were prioritised according to various criteria[1] (Oberholzer et al. 2022). In 2022, the Swiss Federal Council commissioned three federal offices to examine the impact of the eight most prioritised subsidies on biodiversity: (i) the forest program agreement and (ii) the forestry investment credits, (iii) boarder protection for certain meat products, (iv) agricultural basis contributions, (v) contributions for agricultural structural improvement and (vi) sales promotion for milk, meat and eggs, (vii) the loans for tourism or industrial infrastructures granted within the framework of the New Regional Policy (NRP) and (viii) the reimbursement of mineral oil tax for heavy vehicles used in agriculture and forestry as well as in tourism. They are required to submit proposals for the subsidies reform by 2024. What is new is, that it is not the Federal Environment Agency that has to examine the ecological impact, but the respective federal offices themselves.

This can lead to more ecological knowledge being built up in the administration of the respective sectors, thus, recognising the overarching nature of biodiversity conservation. On the other hand, there is the risk that impact-chains cannot be measured precisely (subsidy - subsidised activity - negative impact on biodiversity), which means that without exact data and cause-relationships the need for action may be negated. Furthermore, in its audit of contributions for agricultural structural improvement, the Swiss Federal Audit Office for the first time included considerations of ecological costs in its audit criteria (SFAO, 2022). In addition, three cantons are now considering and preparing the assessment of canton-specific subsidies with biodiversity-damaging effects.

Hence, there are two tasks for science in the future: 1. Efforts are needed to analyse and measure individual impact-chains and negative effects of different drivers on biodiversity loss and 2. Science need not shy away from considering large complex system interrelationships (e.g. cause-effect relationships between societal activities and ecological impacts), investigating them and drawing conclusions.

For political decision makers it is important to recognise the need 1. for action regarding biodiversity damaging subsidies,2. for the implementation of the upcoming reform proposals – and 3. not to forget the harmful effects of the remaining subsidies.

[1] Including subsidy amount, political feasibility, degree of negative impact on biodiversity (based on the criteria and assessments from Gubler et al. 2020).

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3 Biodiversity Harmful Subsidies in Germany

Florian Zerzawy with the support of Peter Martin, Green Budget Germany (GBG)

Abstract

In the face of stark declines in biodiversity, there exist economic mechanisms that unfortunately accelerate such trends. The subsidization of biodiversity-harming activities in Germany is examined in this article to estimate its damaging effects and identify subsidy policies in need of adjustment or complete abolishment. The article is based on a study published by FÖS in 2021 and its presentation at the BfN conference 'Economic incentives that affect biodiversity' on the Isle of Vilm (13.-16-June 2023) (FÖS 2021a). This brief article first explains different concepts of subsidies and presents Germany's reporting on subsidies (Chapters 1 and 2). It then takes stock of which environmentally harmful subsidies exist in Germany that have a negative impact on biodiversity (Chapter 3). Chapter 4 describes examples of particularly significant subsidies from the sectors of raw material extraction, agriculture, and transport in detail. For these, an assessment is made of the extent to which they are harmful to biodiversity as well as a quantification of the share of these subsidies that is harming biological diversity.

3.1 Background: Biodiversity Damaging Subsidies

Next to climate change, the loss of biodiversity is the most pressing environmental problem of our time (cf. Dasgupta 2021). Biodiversity in Germany has been declining for decades, especially for insects (cf. Seibold et al. 2019) and plant species (Eichenberg et al. 2020). However, this concept is not only a quantitative taxonomic measure as it also describes the genetic, functional, and ecological diversity of a region.

Intensive agriculture, habitat destruction and fragmentation, and increasing soil sealing are the main drivers of biodiversity loss in Germany. However, nutrient and pollutant inputs from non-agricultural sources, deficits in forest management and fisheries, hydraulic engineering measures, tourism, and climate change also play a major role (BfN 2019). Such deficits in biodiversity conservation are linked to **economic incentives rewarding environmentally harmful behaviour** (BfN 2019). Ideally, environmentally beneficial activities should be economically rewarded, while harmful ones would instead lead to disadvantages in competition.

Contrarily, however, numerous subsidies and subsidy-like regulations that undermine biodiversity still exist in Germany. They persist despite Germany repeatedly signing **declarations on the reduction of environmentally harmful subsidies** within the framework of international agreements[1] for almost 30 years and setting itself corresponding goals (cf. FÖS 2020b). Presently, Germany has at least 29 subsidies with a sum of more than € 67 billion per year that are completely or partially harmful to biodiversity (FÖS 2021a).

3.2 Subsidy Concepts and Reporting on Subsidies in Germany

Subsidies are benefits from public funds or the waiver of taxes or duties that usually benefit a specific sub-group, however, there is no generally accepted definition of subsidies (Bär et al. 2011). The receipt of a subsidy is usually linked to certain behaviour, but no direct 'ser-vice in return' is required (Bär et al. 2011; Rave 2005). In principle, definitions of varying narrowness can be distinguished (see Fig. 3.1), thus comparisons of subsidy volumes are only possible when referring to the same concept of subsidies.

[1] E.g., UN Convention on Biological Diversity (CBD), UN 2030 Agenda for Sustainable Development, EU Biodiversity Strategy 2020, German National Strategy on Biological Diversity, UN Kunming-Montreal Global Biodiversity Framework (GBF).

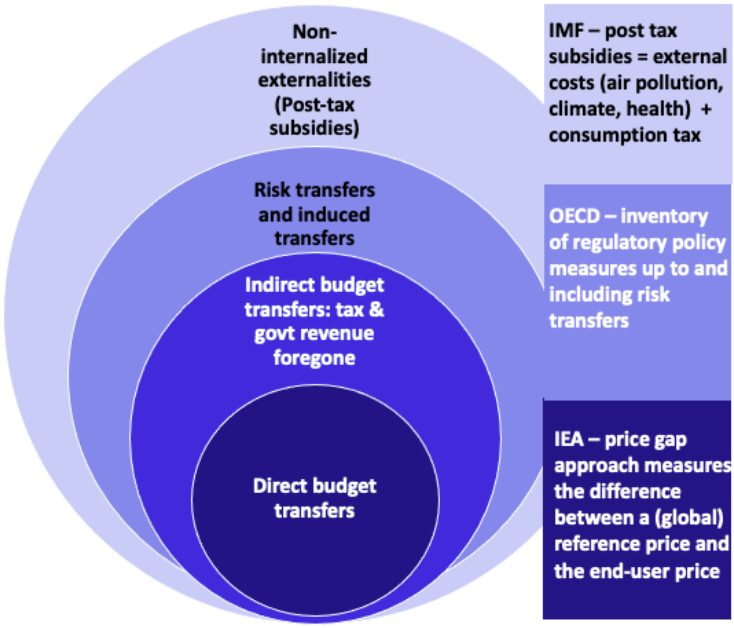

Fig. 3.1: Policy measures categorised as subsidies according to different international organisations (own representation).

Depending on the subsidy definition used, subsidy estimations differ broadly. For this article, we included direct, indirect budget transfers as well as induced transfers when estimating the total volume of environmentally harmful subsidies. This is in line with the subsidy report from the Federal Environment Agency (see below).

In Germany, various state actors engage in subsidy reporting:

- The Subsidy Report from the Federal Ministry of Finance (BMF) provides regular reporting on federal financial assistance and tax incentives, with its most recent version published in August 2021 (BMF 2021). State and local government subsidies, however, are not systematically recorded.
- In addition to the general subsidy report by the BMF, the **Federal Environment Agency (UBA)** also publishes its own report (UBA 2016) at irregular intervals. It deals specifically with environmentally harmful subsidies in Germany. Among grants and tax concessions, other types of subsidies are also included, and environmentally harmful subsidies from the federal states are also covered in part. The UBA report also contains far-reaching proposals for subsidy reduction (UBA 2021).
- The **German Federal Agency for Nature Conservation** published a report specifically on Biodiversity Harmful Subsidies (BHS) in 2019 (BfN 2019), identifying BHS in a number of sectors. Besides calling for reform or elimination of BHS, the BfN report also looks on how environmental costs can be allocated to the polluter by levying specific charges, e.g., for pesticides use or nitrogen application.

3.3 Overview of Environmentally Harmful Subsidies in Germany

Some subsidies granted in Germany provide incentives for environmentally harmful behaviour, consumption, and production, thus contributing to the loss of biodiversity. The following

subsidies in the areas of **resource extraction, agriculture and forestry, transport, construction and housing, tourism, and energy production and consumption** negatively impact biodiversity. A total of 29 subsidies were identified based on a study published by FÖS in 2021 (FÖS 2021a) (Tab. 3.1).

Tab. 3.1: Overview of subsidies with potentially negative impacts on biodiversity

Sector	Subsidy	Volume (million €/year)	Year
Extractives	Discounts from the extraction levy	629	2019
	Privileges for water withdrawal charges	17	2017
Agriculture, forestry, and fishing	Direct payments first pillar CAP	4,850	Ø 2014-2020
	Agricultural subsidies (2nd pillar CAP)	1,300	Ø 2014-2020
	GA Improvement of agricultural structure and coastal protection	600	Ø 2014-2020
	European Maritime and Fisheries Fund (EU fisheries subsidies)	30	Ø 2014-2020
	Fishing fleet: adaptation and development measures	1.7	2018
	Structural measures for sea fisheries	0.04	2018
	Reduced VAT rate on animal products	5,200	2012
	Vehicle tax exemption for agricultural machinery	470	2018
	Tax concession agricultural diesel	467	2018
	Energy crop cultivation (EEG)	NA	-
Traffic	Diesel energy tax concession (diesel privilege)	8,190	2019
	Travelling allowance	4,800	2017
	Tax advantages company car	4,395	2019
	Energy tax exemption kerosene	8,262	2019
	VAT exemption international flights	4,191	2017
	Subsidies for regional airports	41	Ø 2014-2018
	Energy tax concession inland navigation	141	2018
	Energy tax concession for working machines in seaports	25	2018
	Financial contribution to maritime shipping	47	2018

Sector	Subsidy	Volume (million €/year)	Year
Construction and housing	"Baukindergeld"	861	2020
	"Wohnungsbauprämie"	162	2018
	GA Improvement of the regional economic structure and European Regional Fund	320	2018
	Subsidy for fossil heating systems	350	2020
Tourism	Sales tax reduction for accommodation services	1,435	2018
Energy	Energy tax concession for electricity generation	1,800	2019
	Electricity price exceptions industry	17,800	2012-2019
	Energy tax concessions industry	1,137	2019

Source: own representation

These subsidies have a total volume of over €67 billion per year. However, not all directly impact biodiversity. Subsidies for energy production and consumption have a predominantly indirect effect, promoting fossil fuels that drive climate change, while other subsidies do not have a detrimental effect on biodiversity in their entirety. Nevertheless, they contain harmful components, which is why they are listed. Thus, not all subsidies have a wholly biodiversity-damaging effect, i.e., the total subsidy volume cannot be equated with the biodiversity-damaging volume.

3.4 Examples of Biodiversity Harmful Subsidies

When considering the extent to which subsidies are harmful to biodiversity, it is important to first classify whether the subsidy is harmful to biodiversity in its entirety or only in part:

- **Completely damaging**: The subsidy wholly impacts biodiversity negatively and should thus be completely dismantled. The entire subsidy volume is seen as harmful to biodiversity.
- **Partially harmful**: Certain portions of the subsidy are harmful to biodiversity. Accordingly, these harmful parts should be eliminated or redirected. Only this portion of the subsidy volume is viewed as harmful to biodiversity; where possible, it is quantified.
- **Harmful depending on implementation**: The subsidized activity can have a neutral or even positive effect on biodiversity if applied/implemented in a biodiversity-friendly manner. Otherwise, the subsidy should be classified as harmful to biodiversity.

In addition to the **subsidy volume**, the extent of **damage to biodiversity** is also a central factor. However, it is difficult to calculate the monetary damage to biodiversity caused by economic activity since there are rarely clear cause-and-effect relationships. There are also methodological pitfalls in monetization (Seidl & Gowdy 1999).

Following Gubler et. al (2020), the impact on biodiversity is assessed qualitatively based on the following factors:

- **Causality**: Does the subsidy have a direct or an indirect effect on biodiversity? A primary effect (direct effect) exists if biodiversity damage is a direct consequence of the subsidy,

while indirect effects (secondary effects) are biodiversity damages that the subsidy triggers via impact chains.

- **Area effect**: How many and which areas are affected by the activity benefiting from the subsidy? Does the subsidy only have a local effect on individual habitats or a broad effect on numerous habitats?
- **Impact intensity**: How severely is biodiversity damaged? For example, are rare species threatened with extinction by the activity favoured by the subsidy?
- **Duration of the intervention**: Over what period does the biodiversity damage occur due to the activity benefiting from the subsidy? In this context, repetitions or the irreversibility of the effect (e.g. in road construction) must also be considered.

3.4.1 Discount from the Extraction Levy

Through § 31 of the Federal Mining Act (BBergG), the **extraction fee (mining royalty)** is levied on the extraction of **non-mined mineral resources**, amounting to **10% of the market value**, which can be increased to up to 40% by the federal states. Unlike mineral resources, **non-mined mineral resources** are initially 'ownerless' and then transferred by the state to companies. These include the raw materials listed in § 3 (3) of the BBergG such as all **fossil fuels** (coal, oil, and gas) and **metallic raw materials**.

However, extraction fees are only levied in connection with mining rights granted under the scope of the BBergG, i.e., after it came into force in 1982. **Holders of 'old rights'**, i.e., those granted before 1982, are **exempt** from extraction fees (§ 151 (2) No. 2 BBergG). In practice, this mainly affects **lignite mining** and **hard coal**[2] (GIZ (ed.) 2019). Meanwhile, **oil and gas extraction** in Germany, has been subject to extraction levies, with rates generally exceeding the standard of 10%[3].

Building materials such as sands, gravels, and natural stones are natural mineral resources and thusly in most federal states **not subject to taxes**.

The federal states can also set different amounts or exemptions for certain mineral resources or extraction sites (§ 32 BBergG). Possible justifications are threats to the competitive situation, disturbances of the overall economic balance, and securing the supply of raw materials (FÖS 2011). The federal states have made extensive use of this, particularly exemptions for individual mineral resources (e.g. rock salts, peat) and reduced extraction levies (e.g. tree minerals in the new federal states) (cf. GIZ (ed.) 2019).

3.4.1.1 Quantification of the Biodiversity Damaging Share

Raw material extraction has a negative impact on biodiversity. Though the German Federal Nature Conservation Act (BNatSchG) stipulates that the polluter must compensate for the impact by, for example, renaturation, recultivation, or near-natural design of the affected area (FÖS & FUE 2021), mining is accompanied by an irreversible intervention in soils and

[2] Until its end of mining in Germany in 2018.

[3] In January 2021, the state of Lower Saxony decided to fully repay the production levy in 2020 for the companies concerned and to levy only 5% of the market value in 2021. In subsequent years up to 2030, the extraction levy for natural gas is to be reduced from the previous regular rate of 27% on natural gas and 18% on crude oil to the standard levy rate of 10%. According to the state government's estimates, the state will thus forego revenue of 250 million euros by 2030 (Lower Saxony Ministry of Finance 2021).

landscapes. The preferential treatment in the extraction levy is thus **completely detrimental** to biodiversity.

Due to the restrictions and exemptions noted in the previous section, **revenues from the extraction levy are negligible** in most federal states (FÖS 2016). In 2018, they totalled approximately € 240 million (GIZ (ed.) 2021). The lost revenue is to be considered a **subsidy**, which, if taken as the market value, totalled up to **€ 629 million** in 2019, of which approx. **€ 180 million** were for **lignite** alone.

3.4.1.2 Extent of Biodiversity Degradation

The reduced extraction levy has a **medium level** of harmful effect:

- The subsidy has a **direct impact** on biodiversity, as the extraction of raw materials at the location of the subsidy leads to impairments such as landscape destruction and damage to native species. Additionally, indirect negative effects on biodiversity arise from climate change (in case of lignite).
- **Medium area impact**: Even though interventions at the respective sites are often serious, the total area affected in Germany is limited. In 2017, about 1,527.75 km2 of the area in Germany was occupied by raw material extraction, about 0.4% of Germany's total area (UBA 2019).
- **Impact intensity and duration**: However, the impact intensity of raw material extraction is often very high. Raw material mining often reshapes landscapes for decades; damage, such as landslides, occurs particularly in opencast lignite mining and in some cases leads to significantly restricted subsequent use (FÖS 2015).

3.4.2 Reduced VAT on Animal Products

Value added tax (VAT) was introduced in Germany in its current form in 1968. **Foods of animal origin** such as meat, fish, milk (products) and eggs are generally not subject to the regular rate of 19%, but to a **reduced rate of 7%**. Based on the VAT reduction for animal products in § 12 (2) No.1 UStG, the federal government lost an **estimated €5.2 billion** in 2012 (UBA 2016).

The policy's aim was to guarantee equal access to all basic foodstuffs. At the time of the introduction, a reduction for animal products was justifiable, as they were a rarely affordable commodity for parts of the population; thus, nutrients such as proteins, iron, or calcium were not always covered.

However, meat consumption in Germany has risen sharply since then and now is two to four times higher than the amount recommended by the German Nutrition Society (FÖS 2020c). Since the year-round variety of food available today enables easier substitutions of animal proteins with plant ones, these subsidies are no longer necessary. They merely increase the incentive to choose animal products over plant-based alternatives.

The negative environmental and climate impacts of this incentivized mass production of animal-based foods are grave. A large proportion of greenhouse gas (GHG) emissions from agriculture are attributable to livestock farming, and the production of animal feed takes up about 60% of agricultural area. Air pollutants such as ammonia endanger humans and the environment, and pollutants such as pesticides and pharmaceuticals used in livestock farming end up in soils and waters, endangering native species or enabling invasive ones. The application of farm manure leads to harmful nitrate excesses, and the use of large agricultural machinery causes soil compaction (for a detailed description, see FÖS 2020c).

3.4.2.1 Quantification of the Biodiversity Damaging Share

Since the reduction of VAT on animal-based foods encourages their overconsumption and gives a tax advantage over plant-based alternatives, **this subsidy of €5.2 billion** must be seen as **completely damaging to biodiversity**. A complete abolition of this tax privilege would therefore be desirable.

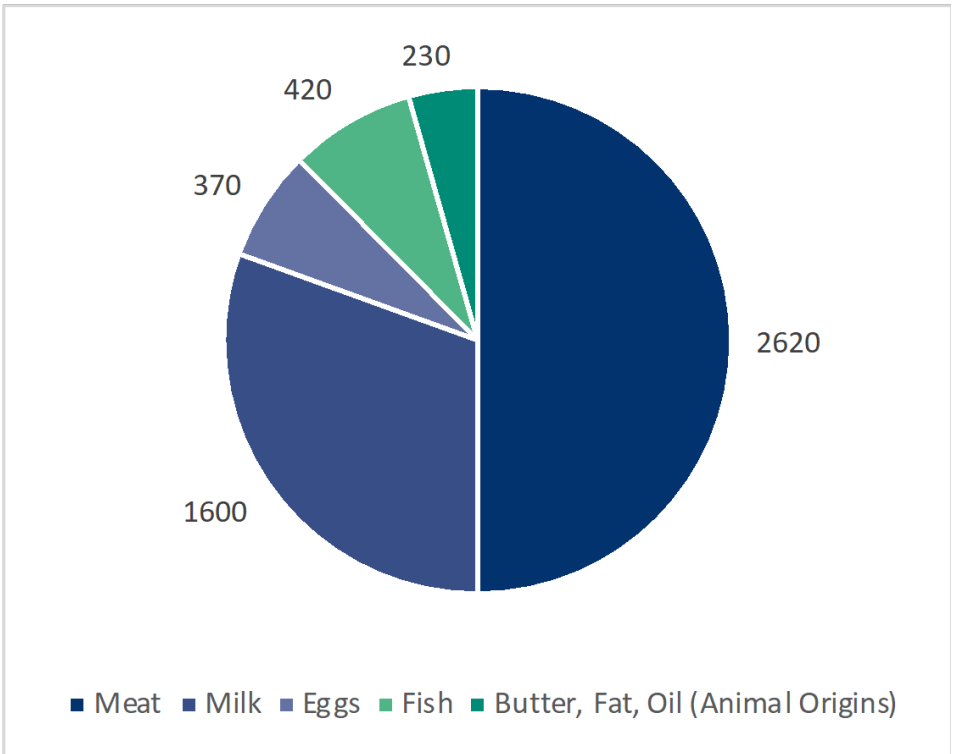

Fig. 3.2: Subsidy volume by product group in million € (BMEL 2016; own calculation).

(As shown in Fig. 3.2), a large part of the subsidy volume concerns meat and dairy. These are key drivers of biodiversity loss due to the large amount of land used for feed production and the associated GHG emissions.

3.4.2.2 Extent of Biodiversity Degradation

The biodiversity-damaging components of the VAT reduction on animal foodstuffs can be assumed to have a **high degree of damaging effects**.

- The subsidy has a **direct impact** on biodiversity by reducing the purchase price of animal foods, thus incentivizing their mass production while making some plant-based alternatives less fiscally viable. Additionally, the reduction in VAT has an indirect impact on biodiversity through the **high GHG emissions** of animal agriculture.
- The subsidy has a **strong area effect**, as more than half of the agricultural land used for animal food production must be used to grow feed.
- The subsidy contributes to a **permanent overloading of soils and waters** with nitrates and trace substances.

It must be mentioned that the abolition of the VAT reduction can only be one aspect of reducing the biodiversity threat posed by livestock farming in Germany, as the export volume of animal products has increased significantly in recent years; incentives for biodiversity-damaging production methods must be reduced on both consumption and production sides.

3.4.3 Travelling Allowance

The **travelling allowance** lets employees claim travel expenses as **income-related expenses** in their income tax return at a rate of **30 ct/km**[4,5], regardless of the means of transport (§ 9 EstG), costing the state **€ 4 to 5.6 billion annually** (IfW Kiel 2018; Jacob et al. 2016; UBA 2016). The travelling allowance subsidizes commuting, promoting the trend toward longer commutes and urban sprawl. This is accompanied by higher traffic volumes, road construction, and land consumption, which contribute to the fragmentation of habitats and damage to ecosystems.

Although the travelling allowance is independent of the mode of transport, 60% of all journeys to work were made by car in the period 2010-2019 (see Fig. 3.3) (Karlsruhe Institute of Tech-nology 2020).

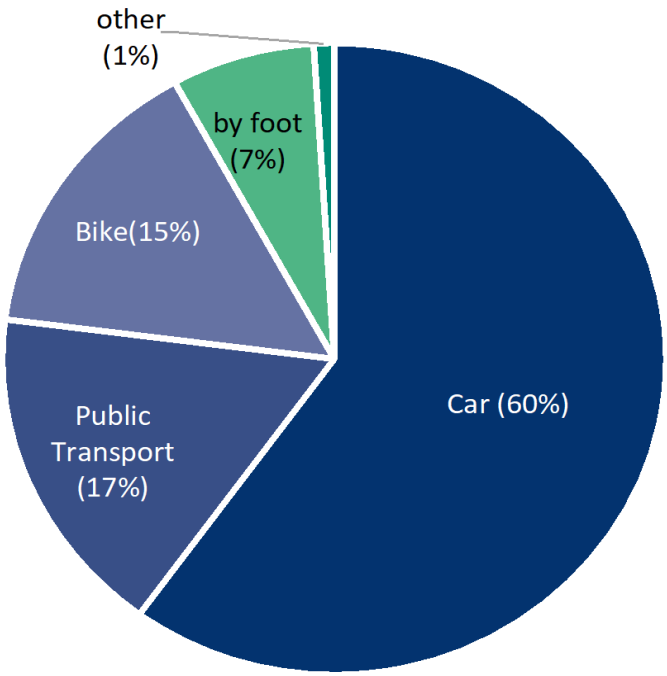

Fig. 3.3: Share of transport modes in the traffic volume of direct commutes to work 2010-2019 (own representation based on the German Mobility Panel, Karlsruhe Institute of Technology 2020).

Income-related expenses[6] can be claimed as a lump sum up to € 1,000 per year; the commuting allowance only applies once that lump-sum is exceeded. The tax relief effect of the allowance also depends on the level of the personal marginal tax rate, higher tax rates yield a greater absolute reduction in income tax payable. **The relief effect therefore increases with**

[4] To cushion rising costs from the CO2 price for long commuters, the flat rate was increased from 30 to 35 ct from the 21st distance kilometre beginning of 2021. From 2024 to 2026, the amount will be increased by a further 3 ct. This will cost an additional € 20 million, 169 million and 212 million in 2021, 2022 and 2023, respectively (Bundesregierung 2019).

[5] Low-income earners who do not pay income tax and cannot claim any commuting expenses will receive a 'mobility bonus' amounting to 14% of the commuting allowance.

[6] In addition to travel expenses, they include, e.g., costs for work equipment, entertainment expenses, business trips, training costs.

income, although the absolute costs of a rail ticket or fuel are the same for everyone (IMK 2019).

3.4.3.1 Quantification of the Biodiversity Damaging Share

The distance subsidy is **partially harmful to biodiversity**. A large part of the subsidy benefits car traffic, which is used by most commuters, with smaller proportions for public transport or biking (see Fig. 3.3). The biodiversity-damaging share of the subsidy is therefore estimated to be at least 60% (see Fig. 3.3), i.e., around € 2.4 to 3.36 billion per year.

3.4.3.2 Extent of Biodiversity Degradation

In the case of the biodiversity-damaging components of the travelling allowance, a high degree of direct and indirect damaging effects can be assumed:

- **Causality**: Through additional traffic, the subsidy directly impacts biodiversity with noise and light emissions, pollutant inputs (fossil fuel combustion, brake and tire abrasion), and the direct killing of animals. According to our own estimates[7], car commuting accounts for around 90 billion person-kilometres per year. A further **direct effect** of the travelling allowance is the fragmentation and destruction of ecosystems through landscape the sealing off habitats with urban sprawl and road construction. **Secondary effects** arise from the climate-damaging impact of traffic.
- The travelling allowance has a **strong area effect** since it encourages urban sprawl and thus affects a wide range of living spaces. In turn, new construction outside of cities encourages additional road construction due to, among other things, additional trips to work, shopping, and recreational activities. Land consumption for transport purposes has been increasing in Germany for many years and, at over 18,000 km2 (UBA 2020a), accounts for about 5% of Germany's total land area.
- **Impact intensity and duration**: Habitats for species are permanently and irreversibly lost due to sealing of surfaces and fragmentation of landscapes from urban sprawl.

3.5 Conclusion and Findings

In Germany, biodiversity is declining at an ever-increasing rate. Environmentally harmful subsidies contribute to the loss of biodiversity, creating economic incentives that reward nature-harming behaviour. Such subsidies can be found in all sectors. We identified **a total of 29 subsidies**, with a total annual volume of more than **€ 67 billion**. However, not all subsidies have a wholly biodiversity-damaging effect, i.e., the total subsidy volume cannot be equated with the biodiversity-damaging volume. Important examples of subsidies are:

- In the **extractive industry**, many mineral resources are exempt from extraction fees. This does not provide any incentives for resource conservation.
- In **agriculture**, the reduced VAT rate on animal foodstuffs promotes the consumption of meat, fish, milk, and eggs over plant-based alternatives. Livestock farming is particularly

[7] The 18.4 million employed persons in Germany have an average commuting distance of 36.2 km (outward and return journey) (Karlsruhe Institute of Technology 2020) on an assumed 225 working days per year. The total transport effort thus amounts to 149.9 billion person-kilometres. With a share of 60 %, the distance travelled by car amounts to 89.9 billion person- kilometres, or around 14 % of the 642 billion kilometres of total mileage (FÖS 2020a; UBA 2020b).

responsible for the loss of biodiversity.

- **Traffic**, especially road transport, contributes significantly to the loss of biodiversity through fragmentation of ecosystems, air pollutants and GHG emissions. The traveling allowance creates incentives for long commuting distances, company car and diesel privileges promote motorized individual transport.

Some subsidies could be redesigned to minimize the negative impact on biodiversity, such as agricultural subsidies or the traveling allowance. While a complete abolishment of EU agricultural subsidies would lead to only large farms to survive, as counterfactual scenarios show (Brady et al. 2017; Arnott et al. 2021), repurposing of subsidies to promote ecosystem services can substantially reduce the impact of agriculture on biodiversity.

Other subsidies are completely detrimental to biodiversity, such as the discounts from extraction levy and reduction in VAT for animal-based foodstuffs. They should be abolished altogether. In the case of the extraction levy, this would require amendments to the Federal Mining Act and the adaptation of the state ordinances (FÖS 2016). The increase in VAT on animal foodstuffs would be in line with the EU-VAT directives and could therefore be implemented quickly and easily. For reasons of acceptance and to avoid hardship cases, however, the basic social security benefits should be raised at the same time and time should be allowed for informing citizens (FÖS 2021b).

For selected subsidies, we quantified the biodiversity-damaging share and assessed the extent of the damaging effect according to the categories low, medium, and high (Tab. 3.2). Criteria used were the causality between subsidy and biodiversity loss, the area effect, the effect intensity, and the duration of the intervention.

Tab. 3.2: Assessment of the biodiversity-damaging effect of selected subsidies

Subsidy	Subsidy volume	Biodiversity damaging share		Extent of the damaging effect
	billion €/year		billion €/year	
Discounts from the extraction levy	0.63	completely	0.63	medium
Reduced VAT rate on animal-based products	5.2	completely	5.2	high
Travelling allowance	4.8	partially	2.30-3.36	high

Source: own illustration

The **VAT reduction on animal-based foods** scores poorly in all categories: it has a high annual subsidy volume and a high degree of damaging effect on biodiversity. The subsidy volume could instead be used to promote healthy and sustainable nutrition, especially for low-income households, or complementary measures such as school and club sports (FÖS 2021b).

Changes to the travelling allowance are also urgently needed from the perspective of biodiversity protection. With a reform, e.g., in the form of a conversion into an 'income-independent mobility allowance' for public transport, both social hardships could be cushioned and the biodiversity-damaging effect greatly reduced (FÖS 2021b).

Finally, **preferential treatment of the extraction levy for mineral resources** should be abolished, even if the subsidy is not quantitatively as significant as other subsidies. It would make even more sense to replace the value-based extraction levy with a quantity-based tax (primary building materials tax) to better reflect the damage effect, which is usually linked to the extraction volume (see FÖS & FUE 2021).

Despite numerous commitments and declarations by Germany at national and international level on biodiversity protection and the reform of environmentally harmful subsidies, there has been little progress in reducing them in recent years. In view of the dramatically progressing climate and biodiversity crisis, the federal government should give high priority to the reduction of environmentally harmful subsidies and finally turn words into deeds.

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4 Promises and pitfalls of the EU's Common Agricultural Policy – towards performance-based financial support

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Abstract

The European Union continues to spend a sizable share of its annual budget for financial support to agriculture. The recent 'greening' of the Common Agricultural Policy has been introduced to provide incentives for farmers to care more for environment, climate and biodiversity and involves the allocation of 25% of the basic area support through dedicated eco-schemes, while the Rural Development Funds co-funded by Member States must dedicate 35% of spending's for 'green' purposes. Despite a claim for being **result-based**, the spendings are in reality **prescription-based**, as farmers must adhere to a set of predefined practices and measures. There are no obligations for payment schemes that are truly **performance-based** in the sense that payment levels reflect the actual environmental improvements compared to a benchmark. The economics literature shows that **prescription-based** measures are not cost-effective and not environmentally effective either. This is because the cost-effectiveness of a particular measure will often depend on spatial characteristics, e.g. in relation to a buffer zone primarily its width, proximity to water, and variety and density of terrestrial habitats, given the soil's type, gradient and climate zone. In this contribution it is demonstrated how environmental-economic modelling can be applied for a more cost-effective approach, where financial incentives to farmers will be targeted to reward efforts, where the largest benefits can be expected to arise. In turn, such an approach would be more beneficial to fulfill the greening objectives, as EU financial support would not be wasted on measures that have little or no impact on environment, climate or biodiversity.

4.1 Introduction

Ever more, intensive farming has been a notorious driver of the declines in biodiversity recorded over the past decades. Within the European Union 40% of the total land area is farmed and EU expends 1/3 of its budget – in total about €64 billion annually – to support agricultural activities via the Common Agricultural Policy (CAP). A relatively timid – and unsuccessful (cf. ECA, 2017) - effort towards a greening of the CAP took place in the previous programming period (2014-22) with requirements for farmers to institute so-called Ecological Focus Areas (EFAs) on their agricultural lands.

The CAP of the current programming period (2023-2027) has expanded greening requirements to farmers, making 25% of the financial support per hectare contingent on participation in so-called eco-schemes, aiming at biodiversity and climate. There will also be strings attached to the financial support through 'conditionality', i.e. for a minimum 4% non-productive features at arable land to improve biodiversity. Moreover, the CAP's rural development programs – co-funded by Member States - are obliged to commit 35% of their resources to environment and climate purposes.

In the years to come, the European Commission will more carefully oversee and monitor how Member States implement the CAP incentives to farmers. National CAP Strategic plans are a prerequisite for the funding, and with biannual reviews, the European Commission will analyze their implementation, providing opportunities to guard the principles laid down in the legal framework of the CAP and the European Green Deal (Münch et al., 2023).

This article highlights some basic shortcomings of the greening efforts. Despite a claim for making a share of payments to farmers **result-based** (favoring biodiversity and climate), EU and its Member States rely in fact on a **prescriptive** approach. To obtain greening payments farmers are required to implement certain predefined land management measures, notwithstanding the actual environmental impacts. A more **performance-based** approach, with payments reflecting actual impacts at farm level, would be more environmentally and economically effective. Such an approach is absolutely feasible, when relying on environmental modelling and economic tools, as illustrated here with data on nutrient leaching.

4.2 Nutrients: a main driver of biodiversity depletion

About 50 per cent of the terrestrial species are in decline according to the Danish Biodiversity Council (Biodiversitetsrådet, 2022). Farming has been identified as one of the key pressures, with the excess applications of nutrients contributing to marginalize plants and insects that used to thrive on nutrient poor lands (heaths; meadows; grasslands).

Although CAP financial support is area-based and no longer tied to productivity as in its early days (1960's-1980's), the country-specific support levels continue to differ, being tied to the historical disbursements. Despite some efforts towards 'convergence' of support levels, this allows farmers in the older EU Member States (EU9) to retain higher levels of CAP support per hectare than farmers in countries in the south or east that have joined EU more recently (see Fig. 4.1) (EC, 2018 and 2019). In turn, the high financial support levels enable farmers in EU9 to maintain high levels of inputs in terms of fertilizers and pesticides. Fig. 4.1 clearly shows how use of mineral fertilizers closely reflects the area support paid out to farmers, with intensity levels >75 kgN/ha prevalent in EU9. This is despite availability of nitrogen in manure, frequently doubling effective application levels.

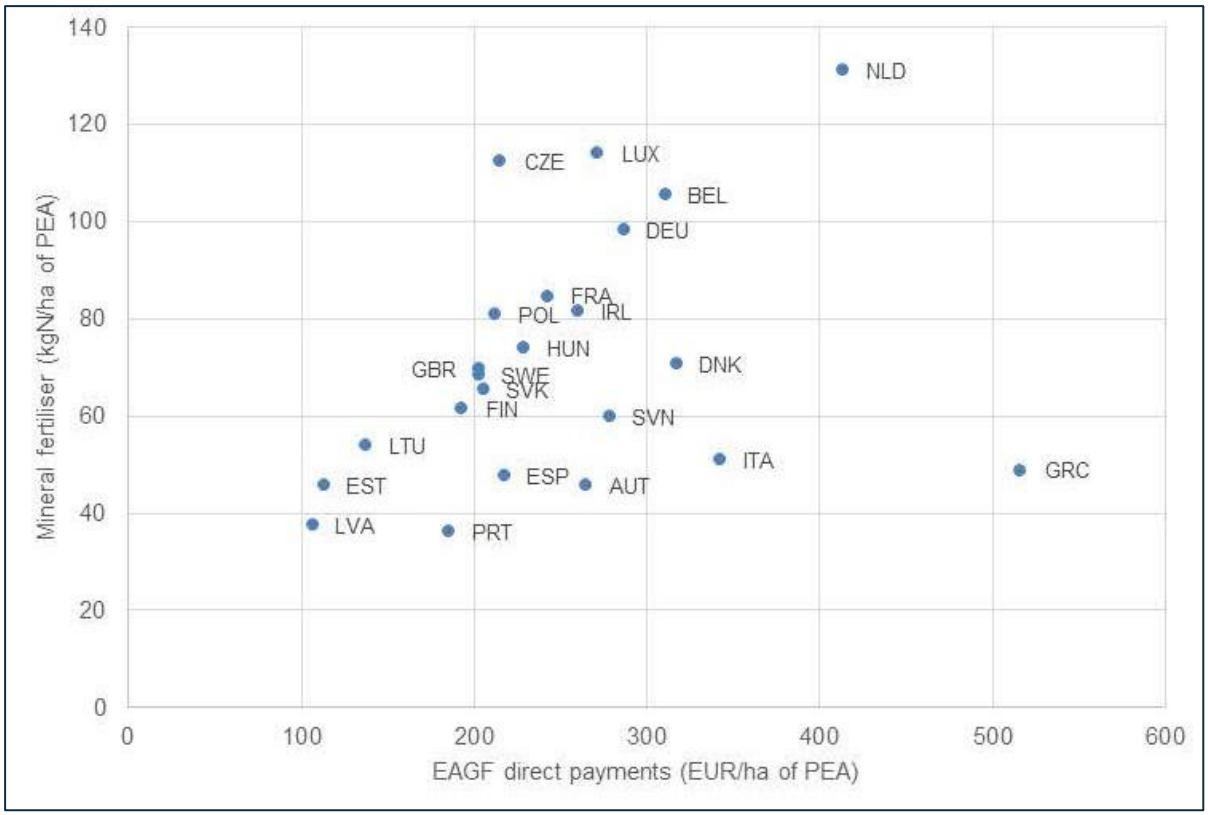

Fig. 4.1: Mineral fertilizer use relative to CAP area payments from EAGF (European Agricultural Guarantee Fund). EAGF the 'first pillar' of the CAP provides income support to farmers as area payments decoupled from production. Excluding coupled support and national top-up payments because some of those payments are animal based. PEA = Potentially Eligible Area (EC, 2018 and 2019).

The high densities of livestock in the same countries, combined with the generous applications of mineral fertilizers, thus lead to relatively high nutrient surpluses – e.g. nitrogen fluxes that evaporate into the air as ammonia or leaches into ground- and surface water bodies. Although since 1990 these surpluses have declined in many countries, they remain at high and unsustainable levels especially in those countries with high levels of CAP area support (see Fig. 4.1 and 4.2). Farmers are frequently tempted to add an extra dose of nutrients to hedge against the risks of crop failures – and because they take pride in ensuring that crops are thriving, the nutrient doses routinely exceed what is strictly profitable (Nielsen, 2005). Even countries with regulated nitrogen quotas per farm suffer from surplus nutrients, as allocations are too generous and do not take account of long-term mineralization processes (Andersen and Bonnis, 2021). Moreover, since manure is voluminous and costly to transport, some farmers circumvent requirements, with excess application on a smaller share of land, accelerating surpluses (Grant et al., 2011).

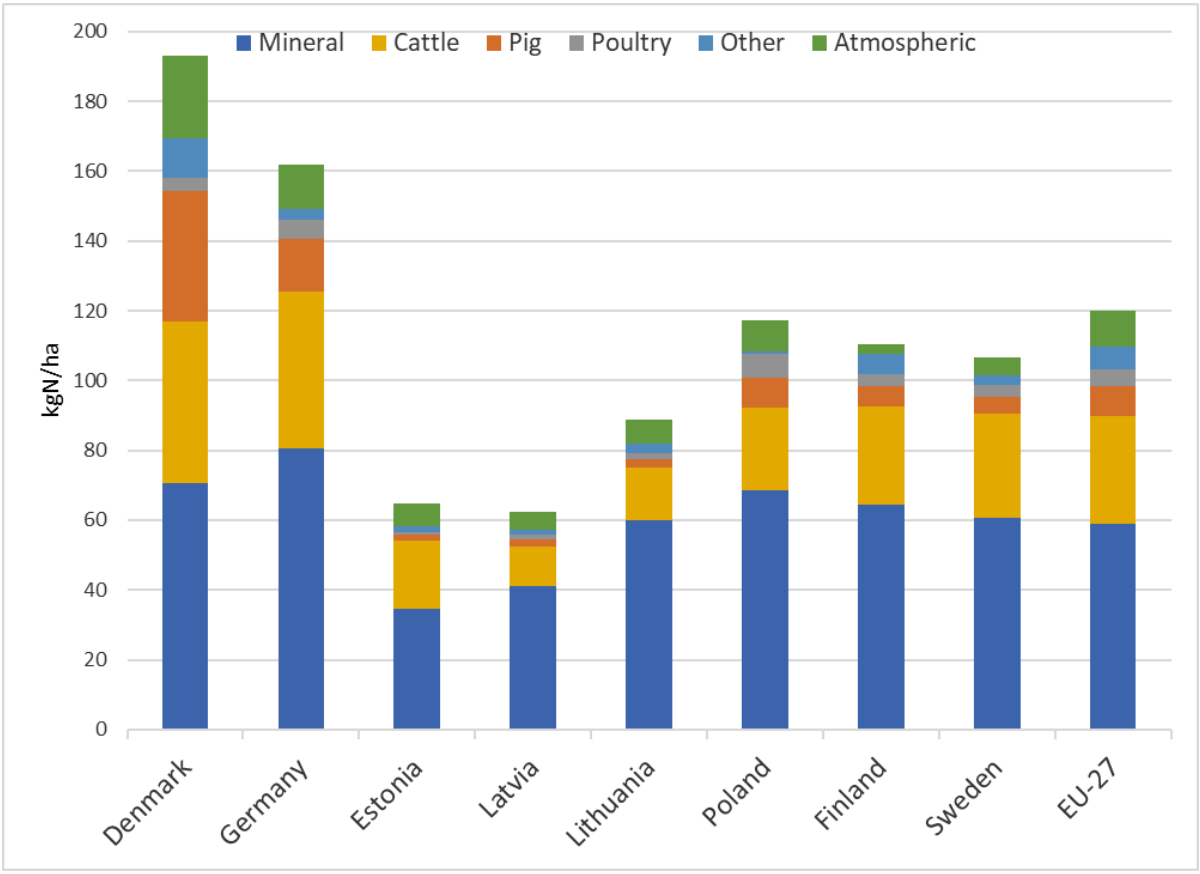

Fig. 4.2: Sources of nitrogen per hectare of farmland in Baltic Sea countries 2015 (Eurostat 2023).

Despite attempts to govern nutrient use dating back more than thirty years, to the EU's 1991 Nitrates Directive, a recent study shows how lax implementation prevails (Thorsøe et al., 2022; Brady et al., 2022). Lack of sufficient manure storage capacity, and manure spreading done with outdated technology (broad-spreading), impede the substitution of mineral with organic fertilizers, in turn explaining why the large nutrient surpluses continue - despite the wording of the Nitrates Directive that farmers should adjust the dose of nutrients to the needs of crops. Hence 97% of the Baltic Sea, in which the Isle of Vilm is located, continues to suffer from eutrophication (HELCOM, 2018) and a negative tipping point for marine biodiversity with disappearance of the Western cod is looming. The large and unsustainable nitrogen surpluses of countries with high livestock concentrations (Denmark, Germany) are more than twice the surpluses in other littoral countries – while it would easily spell disaster to the Baltic Sea if Poland, with 50% of the farmland in the region, converges towards the same model of intensive farming for its full territory as in its Western part (Thorsøe et al., 2022; Brady et al., 2022).

4.3 The pitfalls of prescription-based greening

Despite the noble intentions of greening agricultural support, the new eco-schemes, of the current CAP (2023-2027), largely continue the **prescription-based** approach that also characterized the former EFAs of CAP from 2014-21. The support schemes prescribe what farmers must do in terms of specific measures on their lands, with limited flexibility and with no consistent relationship between measures and the expected impacts for biodiversity and climate.

The EFAs required farmers (>15 ha) to ensure that at least 5% of their agricultural area is used to safeguard and improve biodiversity – however with the principal options of land lying fallow

or various buffer strips being subject to possible conversions, e.g. to nitrogen-fixing crops or catch crops. As shown by the European Court of Auditors (2020) the generous scope for conversions was popular among farmers, whereby the share of non-productive EFA lands favoring biodiversity declined below the targeted 5% in all but two Member States (Fig. 4.3), and for the EU total to only 2% (ECA, 2020). Biodiversity experts from across EU consistently rank nitrogen-fixing crops and catch crops as less beneficial to biodiversity than buffer strips, fallow land and other non-productive measures providing space for species (Pe´er et al., 2017).

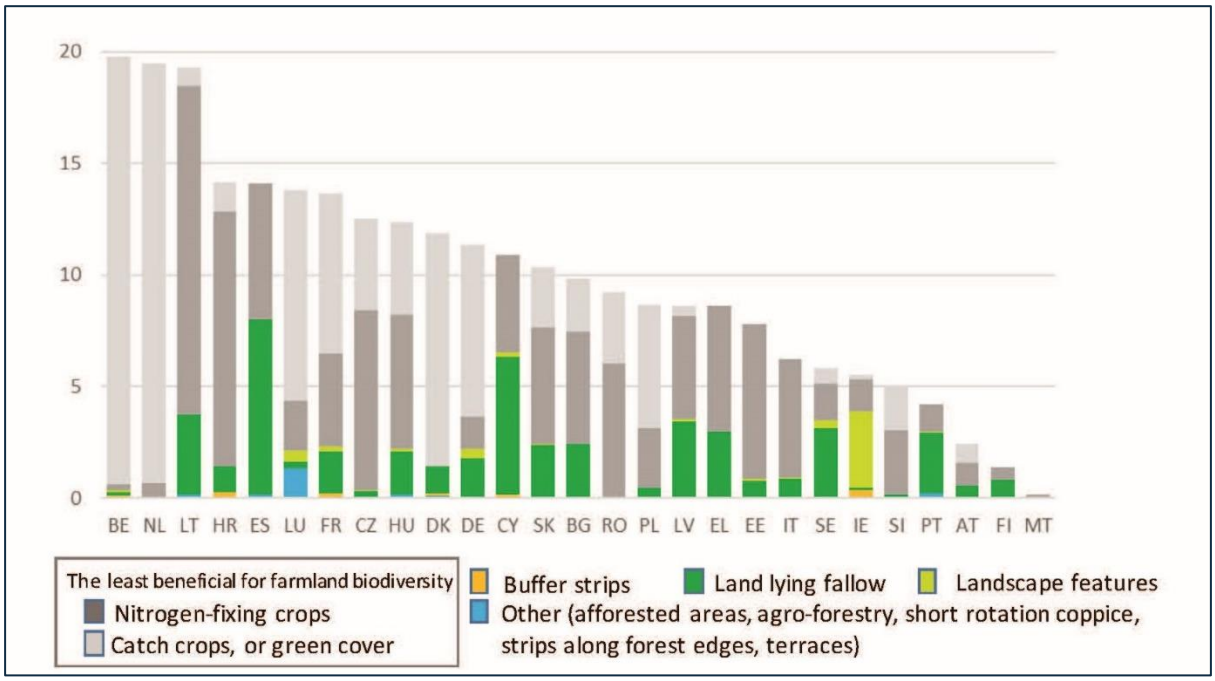

Fig. 4.3: Various Ecological Focus Areas as per cent of arable land in EU Member States 2017 (ECA, 2020).

While the new CAP aims to double the cropland area for non-productive purposes to 4% to benefit biodiversity, the associated eco-schemes largely maintain the **prescription-based** approach. Eco-schemes are a prerequisite to obtain a share in the 25% of the area (hectare) support and are thus voluntary to farmers (>10 ha). The possible measures include organic farming, integrated pest management, agro-ecological practices, precision farming, agro-forestry or carbon farming as well as animal welfare improvements. The conversion opportunities are continued, as the share of non-productive land can be reduced to 3% where farmers engage in eco-schemes, that will correspond to another 4% of land – or (again) cultivate nitrogen-fixing crops or catch crops.

The problem with the strong focus on the specific measures is the lack of a specific understanding of the extent to which they will actually benefit biodiversity and climate, despite the claim for a **result-based** approach. There are no obligations for payment schemes that are truly **performance-based** in the sense that payment levels reflect the actual environmental improvements compared to a benchmark. The economics literature shows that **prescription-based** measures are not cost-effective and not environmentally effective either (Ollikainen et al., 2019). This is because the cost-effectiveness of a particular measure will often depend on spatial characteristics, e.g. in relation to a buffer zone primarily its width, proximity to water,

and variety and density of vegetation, given the soil's type, gradient and climate zone.

To benefit biodiversity and achieve deep nutrient surplus reductions, while maintaining reasonable agricultural productivity, it is essential that farmers are rewarded for engaging in pollution abatement, which can be achieved by switching to some form of **performance-based** payments. The better the abatement effect, the higher the farmers' payment when based on performance or results. Conversely, potential payments will be low where the effect is poor, thereby discouraging farmers from implementing measures where they have too little effect relative to the cost—and payment—to be a sensible use of farmers' and taxpayers' resources. Furthermore, payments based on performance will provide incentives for innovations in farming practices that improve the effectiveness of existing measures and reduce costs over time.

Given that farmers are motivated to a large extent by the pursuit of income from farming, payments based on performance will also promote cost-effective abatement, because it will be in the farmers' interest to optimize the choice and placement of measures for nutrient abatement. **Performance-based** payments would also address the common criticism that todays' **prescription-based** payments are too low to motivate many farmers to apply them, particularly on the most intensively farmed fields.

4.4 Towards performance-based approaches

Due to the spatial characteristics of the farming landscape, there are huge differences in how specific measures will deliver environment and climate benefits. Soil types and habitats vary across landscapes with inherent differences in the associated biodiversity. The same reductions in nutrients will have different implications according to the specific circumstances of the local environment; depending on the properties of the landscape, its soils and how its water bodies are constituted. Shallow lakes and coastal waters with slow turnover will respond differently than water bodies with greater depths and/or faster throughput and mixing of receiving waters.

These differences are often well documented and can be captured with some of the numerous environmental models that have been developed over the past decades. Better use could be made of these models to inform the greening of the EU's financial support to farmers. By differentiating financial support according to the specific impacts that can be obtained with place-based emissions reductions there are opportunities for a more **performance-based** approach.

Drawing on monitoring data from the past decades it has been shown how responses in coastal waters to changes in nutrient flows differ considerably, even if responses are measured on the shared scale of sight depth, which is known to determine the extension of sea grasses with their associated marine habitats and biodiversity (Andersen et al., 2019). Concurrently, several studies have shown how the clarity of surface waters determines their economic value for recreation purposes, including for tourism and waterfront property owners (Andersen et al., 2019).

Tab. 4.1 shows how these linkages have allowed to establish the economic value of nutrient reductions in the catchments of ten coastal waters around Denmark. The results indicate how nutrient reductions will have higher economic value in some catchments relative to others. This is because a unit of nutrient reduction will have less or no impact in some water bodies – e.g. the shallow Nissum fjord catchment on Jutland's Northwestern coast, where the outflow to the North Sea is inhibited by a sluice. In contrast, the relatively small Helnæs catchment of

the island of Funen seems worth targeting, as it could soon help make the fjord cleaner. Also, some catchments with large recreational interests (Roskilde, Isefjord) on the main island of Zealand (Sjælland) record high economic values of unit reductions in nutrient applications to farmland.

Tab. 4.1: Coastal catchments and unit benefits of nitrogen reductions in discharges, surplus and farmland balance in Denmark. Note: WTP is willingness-to-pay; UAA is utilized agricultural area; N nitrogen (Andersen et al. 2019).

Catchment	Sum of WTP for property-owners, beachgoers and other residents (million €)	Leaching reduction to estuary (tons N)	Unit benefit per kg N reduced to inlet (€)	Fertilizer surplus reduction to root-zone (tons N)	Unit benefit per kg N reduced to rootzone (€)	Surplus fertilizer reduction (kgN/ha)	Unit benefit per hectare of farmland with policy scenario (€/ha UAA)
Roskilde	1.16	139	€8.38	855	€1.36	15	€20
Isefjord	2.31	296	€7.81	735	€3.15	15	€46
Helnæs	2.11	66	€31.68	214	€9.82	18	€176
Odense	2.18	439	€4.96	1.063	€2.05	17	€34
Horsens	2.49	252	€9.89	634	€3.93	19	€73
Randers	2.05	832	€2.47	3.635	€0.56	19	€11
Mariager	3.13	286	€10.93	753	€4.15	21	€86
Ringkøbing	6.03	1.276	€4.73	6.128	€0.98	29	€28
Nissum	0.81	597	€1.35	2.736	€0.30	28	€8
Skive	12.45	1.075	€11.59	3.959	€3.15	23	€72
Sum	**34.72**	**5.258**	-	**20.713**	-	-	-

When considered in conjunction with other environmental benefits of reduced nutrient applications, notably human health effects of avoided drinking water contaminations and ammonia emissions along with the curbed global warming impacts of nitrous oxides from fertilizing, we find environmental benefits ranging from about €50 and up to well above €120 per hectare for a scenario with a 35 per cent reduction in nutrient use (see Fig. 4.4). While nutrient reductions should never be allocated with uniform abatement ratios across the country, these differences nevertheless underline that a **performance-based** approach would provide incentives to farmers that differ accordingly.

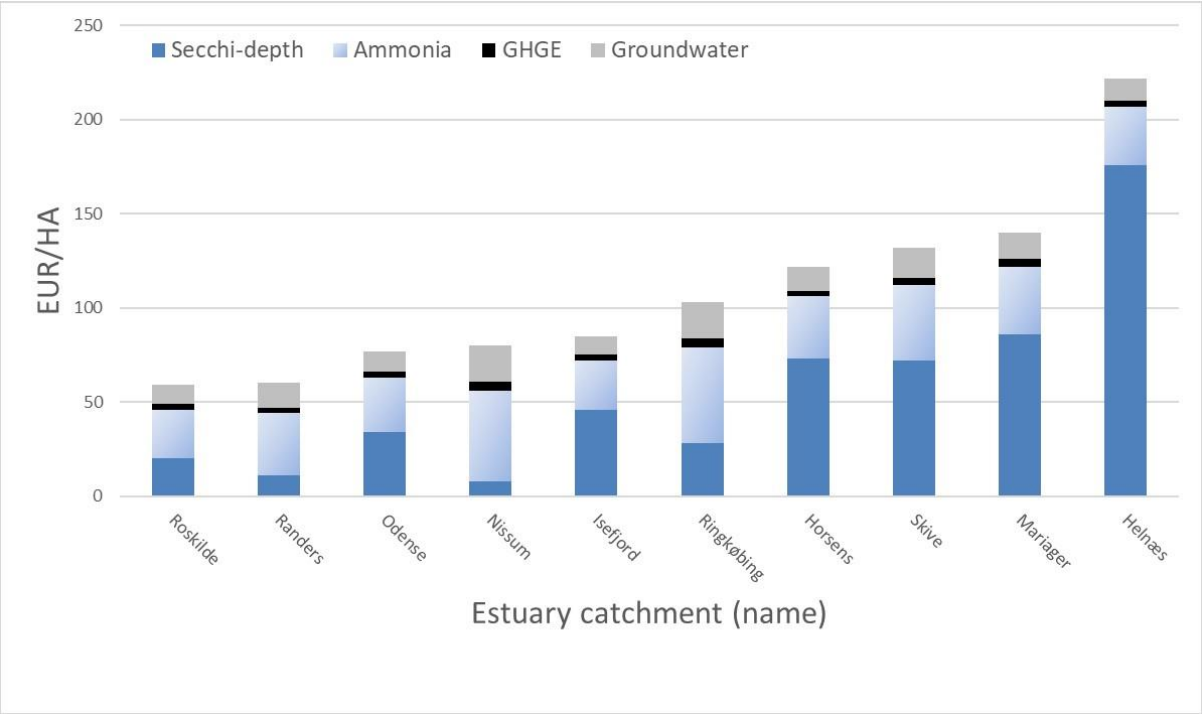

Fig. 4.4: Monetary environmental benefits of nitrogen surplus reductions for selected Danish catchments. Note: Pricing GHGs at €24/tCO2eq (Andersen et al., 2019).

The economic value of terrestrial biodiversity was not factored into the study, but developing an appropriate methodology for that purpose is one of the objectives of the ongoing Sustainscapes project.[1]

Premiums for eco-schemes would be more environmentally effective if they were awarded based on a better understanding of where society and taxpayers will be receiving the greatest benefits.

4.5 Conclusions

Despite complaints from the European Court of Auditors (ECA, 2017) that the EU's greening of the previous CAP was short of 'any scientific justification demonstrating (their) environmental effectiveness' and a call for clear indicators and targets against which impacts and outcomes can be measured, the revised CAP (2023-2027) refers largely to the number and share of hectares receiving support as its yardstick for success.

There is, however, some leeway for individual EU Member States to design their national CAP Strategic Plan with its disbursement mechanisms in a way that could reflect the actual environmental improvements. For instance, by graduating the eco-scheme premiums or using rural development funds according to potential environmental impacts as predicted with the use of environmental-economic modelling expertise. These plans also offer an important point of entry for the wider civil society in gaining an understanding of the problems and pitfalls of the EU's financial incentives to farmers.

[1] For more information about the project see: https://bio.au.dk/en/research/research-centres/sustainscapes-center-for-sustainable-landscapes-under-global-change-aarhus-university.

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5 Economic instruments used for biodiversity preservation and conservation in Lithuania

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Abstract

The use of economic instruments for biodiversity conservation has a dual benefit: instruments can serve as preservation mechanism influencing the behavior of consumers and users and at the same time generate financial funds for biodiversity conservation. This article describes important economic instruments used in Lithuania in favor of biodiversity. It addresses the most commonly used economic instruments like taxes, fees and describes their application in the policy of Lithuania to regulate the use of forest resources (chapter 2), the use of wildlife game resources (chapter 3) and the regulation of fish stocks (chapter 4). Besides the taxes, charges and fees there are other regulative instruments for biodiversity conservation and protection such as compensation schemes to ensure no net loss or net gain of biodiversity and ecosystem services respectively, which are shortly described in chapter 5; chapter 6 outlines the existing environmentally harmful subsidies that damage biodiversity and ecosystems as well as actions for phasing-out; chapter 7 concludes the mentioned findings.

5.1 Introduction – an overview of economic instruments and fiscal policy

Economic instruments are becoming more popular and important in the light of a growing demand for natural resources, the consumption of land for infrastructure, intensive development of agriculture and the process of urbanization. Economic instruments should go hand in hand with the administrative regulation rules. They should be effective and efficient enough to achieve the expected (positive) results on biodiversity and natural resource use. Setting the 'right' price, for example, in the form of tax rates for the use of scarce resources (by applying different methods for price evaluation, e.g. willingness to pay for the biodiversity services provided) is crucial.

In Lithuania, the following policy instruments are used to protect ecosystem services and biodiversity: Deductions from the income received by private forest owners and state forest enterprises for the sold forest and timber under the Forest Act.

- Tax on game resources.
- License fees on recreational fishing.
- Payments for quotas on commercial fishing.
- Compensation to owners for restricted activities in protected areas (PA).
- Further sources of biodiversity funding.

The main objective of the economic instruments listed above is to protect wildlife resources, prevent the depletion of fish stocks and promote the efficient use of resources and ecosystems. Furthermore, instruments can contribute to the protection and sustainable use of forest resources, conservation of forest biodiversity, landscape stability, and quality of the environment, as well as its ability to fulfil ecological, economic, and social functions now and in the future. A detailed description of the economic instruments that serve biodiversity and ecosystem preservation will be presented below.

5.2 Financial/economic means regulating the use of forest resources

Lithuania's forestry is based on generally accepted principles of sustainable forest management. The country follows its commitments made in forest-related international processes (e.g. Forest Europe, UN Forum on Forests) and other policies (2030 Agenda for Sustainable Development and its Sustainable Development Goals, Paris Agreement, United Nations Framework Convention on Climate Change, Convention on Biological Diversity, etc.) both at the level of forest policy-related strategic planning and at the level of local implementation. Strategic documents and legislation on forests are in line with the EU Green Deal, the new EU Forest Strategy for 2030, the EU Biodiversity Strategy for 2030, and other EU policies and legislation. As a continuation of this, the new strategic document on national forest policy is currently being prepared (expected to be approved by the government in 2024), which will provide forest policy measures up to 2030, covering all areas of the forestry sector: forest policy, forestry, forest ecology, biodiversity protection, biomass energy, timber and non-timber forestry, forest science, forest workers, recreation and tourism, etc.

The **Law on Forests**[1] of the Republic of Lithuania is the main legal act defining the directions of national forest policy and the main rules of forest management. The Law on Forests divides Lithuanian forests into 4 forest groups according to their main functions with specific management regimes for each group in place:

Group I – reserve forests. These are the forests of state nature reserves, state parks, and nature reserves as well as reserve districts located in biosphere monitoring territories. Logging is prohibited in the forests belonging to this group, except for the cases provided for in the Law on Protected Areas of the Republic of Lithuania and the regulations of reserves.

Group II – special purpose forests, which include:

A. ecosystem protection forests: Forests or parts of landscape; telmological, pedological, botanical, zoological, botanical-zoological reserves; anti-erosion forests.

B. recreational forests: These are forest parks, urban forests, forests' in state park recreational areas, recreational forest areas and other recreational forests.

Clear felling is not allowed in the forests assigned to this group.

Group III – protective forests: These are forests of genetic, geological, geomorphological, hydrographic, cultural reserves or parts thereof, cultural reserves, regeneration and genetic plots, forest seed stands, field protection, protection zone forests. For protective forests, the area of clear cutting is strictly regulated and cannot be more than 5 hectares. Clear primary logging is prohibited in national parks, with the exemption of wetlands and waterlogged vegetation stands.

Group IV – commercial forests: These are forests not included in forest groups I, II, III. This group of forests comprises:

C. commercial forests with normal felling age. In the forests of this group, the area of clear cutting cannot exceed 8 hectares, except clear sanitary forest cuttings.

D. plantation forests with short felling age. The goal of farming is to grow as much wood as possible as quickly as possible. The forests of this group include fast-growing trees with an age of at least 15 years.

All clear-cut areas should be reforested within 3 years by planting forest trees or by natural regeneration.

The access and use of non-wood products (mushrooms, berries, nuts etc.) is free for everybody in all state and private forests (with some exceptions in special areas, like military zones, state border zones, wildlife farms etc.).

Conversion of forest land into other types of land use is only allowed in exceptional cases and with compensation payments.

The system of financial/economic regulation of forest management ensures that the main forest-related activities are financed 'with the money from the mandatory deductions of 5 percent from the received income of sold timber and uncut forest to a special programme of the state budget' (Law on Forests Nr. I-671, 1994:15). Mandatory deductions are paid by both - State Forest Enterprises (SFEs), which are for-profit entities, operating on a self-financing

[1] Lithuania. Seimas. (1994). Lietuvos Respublikos Miškų įstatymas. [Law on Forests], Vilnius: Register of legal acts.

basis, and by private forest owners. The accumulated funds are used to finance the so-called common forestry needs. Altogether the annual amount of this special programme is about 10 million EUR. Most of the amount is used for maintaining institutions (State Forest Service and Directorate General of State Forests), forest inventory in all forests (state and private), repair and maintenance of forest roads in all forests, applied forest research, training, and advice for private forest owners. State forest managers are obliged to pay 15 percent of revenue from the sale of raw timber and standing forest to the state budget. Of this 15 percent, 5 percent is used to finance common forestry needs, the remaining 10 percent are used for general needs of the state budget. Private forest owners pay 5 percent from the received income of sold timber and uncut forest.

The aim of the Programme for financing common forestry needs is to provide funding for environmental management measures in forests and to contribute to the enhancement of forests and their resources, through the development of sustainable forestry activities that enable the preservation of forests and serve the sustainable needs of society.

The EU financial support according to Lithuanian Rural Development Programme (RDP) 2023-2027 is provided for forestry measures, mainly for afforestation (creation of new forests) on abandoned or agricultural land, but also for the protection of forest ecosystems (MoA 2024). The support amounts to about 20 million EUR (MoA 2024).

Special taxes (revenues from the deduction of sold timber) to the state budget of about 49 million EUR (out of which about 16 Mio EUR go to State Budget Special Programme (SBSP) for common forestry needs) (MoF 2023).

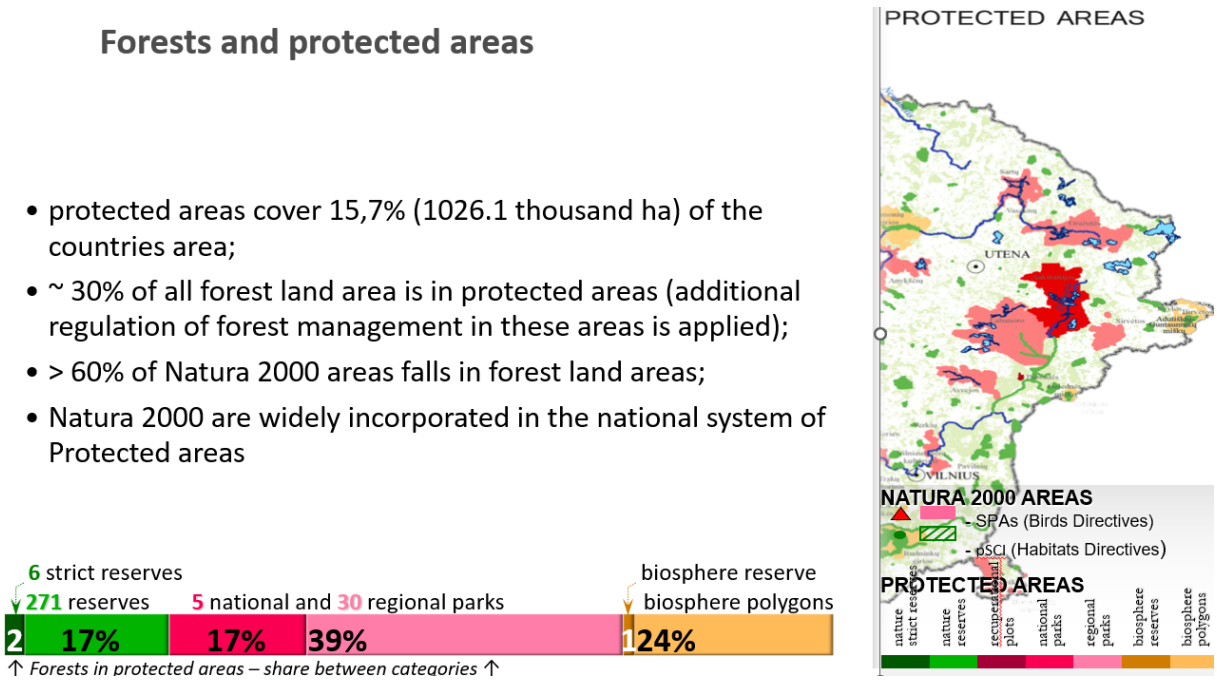

Fig. 5.1: Map of protected areas (MoE 2023)

According to the Law on forests, landowners, or planners, organizing forest land conversion, must compensate for their activities, by afforesting the equivalent area elsewhere or by paying financial compensation to the state budget. This compensation consists of the converted forest lands' market price, the costs of afforestation and forest management up to the age of

the felled tree, the value of the timber and other factors. Compensation paid to the state budget is used for obtaining land for new forests, afforestation and other measures related to forest management and protection.

Violations of the established requirements are subject to administrative liability in accordance with the Code of Administrative Offences[2]. Damage caused to protected species and their habitats, wild fauna and flora is compensated in accordance with the established methodologies for damage calculation.

5.3 Financial/economic means regulating the use of game resources

Wildlife resources as defined by the Law on Wildlife[3] belong to the state and the use of resources is regulated by the Law on Hunting[4] of the Republic of Lithuania. This main legal act establishes the rules of hunting regulation, taking into account ecological conditions of hunting areas, ethical norms, and traditions of the country's hunting culture. The right to use game resources is granted by issuing a permit to either natural or legal persons. According to the law, hunting areas should be formed in accordance with the principles of hunting management and should not be less than 1000 ha. Additionally, they should include forests, fields, and water bodies territory in fixed proportions. Core hunting policies, set up in the Law on Hunting are:

- The state grants the right to manage game resources by issuing permits in hunting areas.
- Permits to use game resources in a hunting area are issued by tender (auction).
- Hunting ground units are formed and their boundaries changed, in accordance with hunting management principles and plans.
- Damage caused by ungulates and beavers, with the exception of bison, to owners, managers, and users of land (e.g. damage to agricultural crops) is compensated by hunters.
- Only damage caused to owners, managers, and users of land by wolves and bison, whose hunting is restricted, is compensated by the state.
- The Law on State Natural Resources Tax[5] defines the object of taxation, the taxpayers, the tax base and the tax rates. The annual tax rate on the use of game resources depends on the category of the hunting ground, which is divided according to its suitability for the life and reproduction of wildlife.

The Payment for the use of game resources consists of two parts, if the right to the hunting ground is obtained by means of a tender:

- the lump sum contribution proposed in the auction and
- the annual tax, the amount of which is calculated according to the tax rates set by the Law

[2] Law Nr. XII-1869 on Code of Administrative offences, adopted by the Seimas of the Republics of Lithuania on 25 June 2015

[3] Lithuania. Seimas. (1997). Lietuvos Respublikos Laukinės gyvūnijos įstatymas [Law on Wildlife], Vilnius: Register of legal acts.

[4] Lithuania. Seimas. (2002). Lietuvos Respublikos Medžioklės įstatymas. [Law on Hunting], Vilnius: Register of legal acts. adopted in 2002, Seimas of the Republic of Lithuania

[5] Lithuania. Seimas. (1991). Lietuvos Respublikos Mokesčio už valstybinius gamtos išteklius įstatymas. [Law on State Natural Resources Tax], Vilnius: Register of legal acts.

on the State Natural Resource Tax (Tab. 5.1) and an annual inflation index adjustment.

Tab. 5.1: Tax rates for the usage of game resources (Law on State Natural Resource Tax)

Category	Characteristics	Tax rate (EUR/ha)
I	deciduous to mixed deciduous & coniferous forest stand	1.04
II	mixed coniferous & deciduous forest stand	0.7
III	mixed coniferous forest stand with a small share of deciduous	0.52
IV	Pure pine forests with a mixture of other types of trees up to 10 %	0.26
V	Fields (agricultural land and bushes) in Marijampolė district	0.16
VI	Fields (agricultural land and bushes) in other districts	0.14
VII	Water bodies	0.06

As the amount of damage caused by wolves and bison increases, the taxes generated to compensate for the damage caused by wolves and bison, should also increase. For example, the damage caused by wolves and bisons is compensated for by the state budget's Environmental Protection Support Programme (EPSP), whose revenues come from the tax on the use of game resources. According to the Law on State Natural Resource Tax, the tax for game resources is distributed as follows: 50 percent is allocated to the State Environmental Protection Support Programme[6] (about 1.5 million EUR annually) and 50 percent – to the Municipalities Environmental Protection Support Programme[7]. The funds are used to finance the development of hunting, protection and increase of game resources, prevention of damage caused by wild animals, whose hunting is restricted or prohibited, scientific research, monitoring of game resources, measures against poaching.

In 2022, compensation to farmers from the Environmental Protection Support Programme amounted to around 123,500 EUR for damage caused by bisons and 290,000 EUR for damage caused by wolves in total 413,500 EUR (Minister for the Environment of the Republic of Lithuania 2023).

5.4 Financial/economic means regulating the use of fish stocks (resources)

The Law on Fisheries[8] of the Republic of Lithuania is the main legal act, which establishes rules on management, conservation and restoration of fish stocks, aquaculture, fish processing and the marketing of fishery products.

[6] Lithuania. Seimas. (2000). Lietuvos Respublikos Aplinkos apsaugos rėmimo programos įstatymas. [Law on Environmental Protection Support Programme], Vilnius: Register of legal acts.

[7] Lithuania. Seimas. (2003). Lietuvos Respublikos Savivaldybių aplinkos apsaugos specialioji rėmimo programa. [Law on Municipalities Environmental Protection Support Programme] Vilnius: Register of legal acts.

[8] Lithuania. Seimas. (2000). Lietuvos Respublikos Žuvininkystės įstatymas. [Law on Fisheries], Vilnius: Register of legal acts.

Two types of water bodies are distinguished: marine and inland water bodies, which differ in terms of fishery regulation and management regimes. Furthermore, the state distinguishes the following:

- Commercial fishing in marine and inland waters are regulated through a quota system and
- recreational fishing (amateur fishing) – through a permit system.

Water body status depends on the type of ownership. There are three types of ownership: state-owned, leased state-owned and privately-owned water bodies.

Users of state-owned and leased state-owned water bodies are required to regenerate fish stocks to maintain optimal productivity of marine and inland water bodies and avoid adverse changes in aquatic ecosystems.

The aim of the Law on Fisheries is to ensure the conservation and restoration of fish stocks, taking into account ecological conditions, the fisheries economy, the interests of fishermen, fish farmers, processors, and consumers. Quotas and permit systems have been introduced to achieve set goals. Fishing quotas, expressed in terms of maximum allowable catches of a particular species, are one of the tools for rational allocation of fishing limits to determine fishing for an operator in inland water bodies or individual opportunities in marine waters. Fishing permits authorize fishing under the conditions specified therein.

State management of the fisheries sector is carried out by two institutions: The Ministry of Agriculture – which organizes, coordinates and controls implementation of fisheries research and controls the use of fish stocks in marine waters, and the Ministry of Environment – which develops policies for the use and control of inland fish resources, coordinates, controls their implementation and organizes fisheries research in inland waters.

Funding for research of fish in water bodies of state importance are financed through the Environmental Protection Support Programme funds or other programs whose revenue come from e.g., sold amateur fishing permit.

5.4.1 Commercial Fishing

There are about 100 economic entities fishing in inland waters, 40 of them in the Curonian Lagoon. About 1,000 tons of fish are caught annually in inland waters, of which 98 percent are fish caught in the Curonian Lagoon.

Fishing limits, expressed in terms of the number of certain types of commercial fishing gear used for commercial fishing and / or fishing locations, are fixed for a period of at least 5 and no more than 10 years. They are allocated to operators following the distribution of a fishing quota. Fishing quotas are set for a period of 1 to 5 years. Quotas determine how much of a particular type of fish can be caught within a defined period, whereas permits determine only the period and the water body in which fishing is allowed but not the species itself. There is no tax set on commercial fishing except the payments for the quotas purchased (acquired) through auctions.

The annual revenues from the auctioning of quotas are about 100,000 EUR. Revenues of inland fishing quotas are used to finance fish stocks restoration and protection measures. Revenues from sold (purchased) quotas are transferred to the state budget. Other funds that are also paid to the state budget include: (1) funds recovered for damage to fish stocks in violation of laws or regulations governing commercial fisheries in the high seas, as well as confiscated proceeds of serious infringements and proceeds from confiscated fishery products and fishing

gear; (2) funds from European Union member states, foreign countries, organizations and citizens, international organizations for the recovery and conservation of fish stocks; (3) funds to offset negative impacts on fish stocks in marine waters from economic activities ; (4) the proceeds of the sale of fish caught in marine waters and of fishery products derived therefrom for research purposes; (5) funds for auctioned individual fishing opportunities; (6) funds for the recovery and conservation of fish stocks in the context of commercial inland fishing.

The use of fish stocks is organized through the granting of permits for fishing areas' usage and through the determination of the appropriate usage conditions. According to the rules set out in legal acts, the state has the right to stop (restrict) commercial fishing in inland waters, if the use of fish stocks poses a risk to the safety of these stocks or if the public benefit is low.

5.4.2 Recreational Fishing

The Law on Amateur (Recreational) Fishing[9] establishes rules for recreational fishing, conservation and rational use of fish stocks. Core fishing policies set up in the Law on Amateur (Recreational) Fishing are:

- Amateur fishing is permitted in all fishing water bodies, if not explicitly restricted.
- Fishing permits may be issued in state-owned water bodies. Only one permit is issued per fishing area of a water body. The Permit to use a fishing area grants the right to use fish resources under the conditions specified therein and organizes recreational fishing in a certain state fishery water body. Permits are issued for 10 years.
- The decisions of the water body manager to grant access via permits to the fishing area shall be taken by auction (the permit can be prolonged without an auction after expiration to the same holder upon application).
- The state determines the right to use the fishing area, the amount of the fee, the payment procedure, and terms of auctioning or not (the permit can be prolonged without an auction after expiration to the same holder upon application).

Fees apply for fishing in state-owned leased water bodies (currently there are 850 leased water bodies). The owner of a surface water body, may use it for fishing purposes or lease this right to other persons. The price for a water body lease, when it is not auctioned, is 3 EUR/ha per year. Fishing permits (licenses) may be issued for fishing in state-owned water bodies that are not leased.

For the following water bodies, permits are issued neither for commercial nor for recreational fishing/amateur fishing: (1) rivers; (2) water bodies in state reserves and state park reserves; (3) water bodies of particular importance for the conservation of valuable natural complexes and biodiversity; (4) water bodies of particular importance for fish migration and spawning; and (5) water bodies of importance for recreation.

The payment for an angling permit, which gives the right to recreational (amateur) fishing, is set in the Law on Amateur (Recreational) Fishing.

[9] Lithuania. Seimas. (2004) Lietuvos Respublikos Mėgėjų žūklės įstatymas. [Law on Amateur (Recreational) Fishing], Vilnius: Register of legal acts.

Tab. 5.2: Payments for fishing permits (Law on Amateur (Recreational) Fishing)

Period of validation	Payment for fishing in state-owned water bodies (EUR)	Payment for fishing in privately and state-owned water bodies where angling is limited (EUR)
1 day	-	5
2 days	3	-
1 week	-	15
1 month	10	30
1 year	30	-

Payments for permits for recreational fishing account for a major part of the funds collected for the EPSP for the use of fish stocks. These funds are used exclusively to increase and replenish fish stocks.

The payment (fee) for the right to use the fishing area is the maximum rate proposed at the auction.

In addition to the auction, decisions on granting the right to use a fishing area, the amount of the fee, as well as the procedure and terms of payment are determined by the Government, or an authorized institution. The payment (fee) amount is the starting point for auctioning the use rights of the fishing area (grounds) in the fisheries water body.

Fees for recreational fishing consist of a fee granting the right to fish and of a fee for the right to fish, which is required only for fishing in the state water bodies, where fishing is restricted.

Fees for recreational fishing permits are paid either to:

(1) the owner of a water body, if fishing in a water body owned by them.

(2) to a lease holder of a fishing water body where he is authorized to fish.

(3) to the state budget in accordance with the procedure established by legal acts for financing the EPSP, when fishing in state fisheries water bodies, which do not issue permits to use the fishing area.

Fishing operators and owners of private fishing water bodies have the right to reduce the amateur fishing permit fee, up to the amount of a one-day amateur fishing permit, or to grant free fishing. They also have the right to restrict fishing for a period longer than provided for in the Law on Amateur (Recreational) Fishing. In private fishing water bodies, fish stocks are protected and restored by the owners of water bodies.

5.4.3 Resource Recovery

In water bodies owned by the state fisheries, which are not authorized to use as fishing grounds, the restoration of fish stocks is organized, and carried out by the state. In the state fishing water bodies authorized to use as fishing areas, fish stocks must be conserved and restored by the users of the fishing area. In private fishing water bodies, fish stocks are to be protected and restored by the owners of water bodies.

The restoration of fish stocks in state fisheries water bodies used for commercial and recreational fishing, which are not authorized (leased) to use as fishing grounds for recreational fishing, is organized and carried out by authorized state institutions. This work is carried out in accordance with programs prepared by the Ministry of Agriculture (Minister for Agriculture of the Republic of Lithuania 2024) and coordinated with the Ministry of Environment.

Revenues derived from the granting of permits are used to finance fish stock restoration and protection measures in non-leased state-owned water bodies. Leaseholders must restore fish stocks using their own resources. The Ministry of Environment allocates about 300,000 EUR annually from the state budget for the restoration of fish stocks (Minister for the Environment of the Republic of Lithuania 2023).

5.5 Compensations paid for restricted activities in protected areas

A major part of the protected areas in Lithuania includes 35 state-owned national and regional parks covering 9 percent of the country's terrestrial area. The Natura 2000 network covers 13 percent of the land in Lithuania and overlaps to a large extent (85 percent) with national protected areas (State service for protected areas under the Ministry of the Environment 2023).

Compensation is paid to landowners, managers, and users of land on whose territory new protected areas have been established or the status of existing protected areas has been changed (including their boundaries, imposed restrictions, or the replacement of existing ones). Owners and managers of land in protected territories are also given tax incentives foreseen in other laws of the country like income tax.

Payments to private forest owners are intended to cover defined operational restrictions in protected areas. Compensation is paid annually for newly established or replaced existing protected areas and for stricter restrictions on forest harvesting (forest felling restrictions) activities. Compensations are financed by state (municipality) budget, when the state authority (municipality council) establishes a new protected area, sets new or changes existing restrictions on those activities. European Union Funds are provided for the limiting and restricting activities in Natura 2000 network areas. In 2023, €3,507,322 was paid out as a result of restrictions on farmer activity (National Paying Agency under the Ministry of Agriculture 2023).

Owners and managers of land in protected territories receive compensation from the state for activity restrictions in protected areas.

Tab. 5.3: Compensations and payments for the restriction of activities of forest owners in Protected Areas (PA) (Source: Minister for Agriculture of the Republic of Lithuania 2023)

Measures of the Lithuanian Rural Development programme 2014–2020 Programme Payments related to NATURA 2000 and Water Framework Directive	EUR/ per year
Supported area in Natura 2000 forests	
Compensations for forest owners due to restrictions of logging rights: CC (clear cuttings) – major logging is prohibited, or selective logging of low intensity is allowed	1,116,009.19
restrictions in felling of mature trees – sanitary felling is prohibited or limited, leaving a certain number of dried trees in ha	62,683.15
restrictions on Non Mature trees – an additional number of uncut green trees is left in the clear main forest felling exchanges	1,648.92
Prohibited sanitation felling of all drying or dried trees	171,398.18
Supported area in 'Natura 2000' on agricultural land	
Arable land	314,386.25
Natural and semi natural meadows	1,683,535.61

The Rural Development programme (MoA 2024) stipulates that:

- by 2024, the area of Lithuania's protected territories will reach 20 percent (currently 18.25 percent), a quarter of which will be strictly protected.
- by 2030, the area of Lithuania's protected territories will reach 30 percent, of which one third will be strictly protected (CBD goals to be achieved until 2030).
- Lithuania does not plan the rapid designation of new protected areas using traditional methods (applying territorial planning procedures), but foresees strengthening the protection and management of already existing protected areas, as well as focusing on the designation of private protected areas (through protection agreements with owners).
- The state also plans to pay more attention to Other Effective Area-based Conservation Measures (OECMs)[10], e.g. for the protection belts and zones of water bodies.

More attention should be given to integrating ecosystem services assessments into decision making processes, focusing on several policy areas (such as biological diversity and landscape protection, protection, management and creation of green spaces and plantations, environmental impact assessments and spatial planning) and economic sectors (such as agriculture, forestry, water) (MoE et al. 2023).

5.6 Environmentally harmful subsidies (EHS)

Subsidies, which are incompatible with environmental objectives still exist. Some of them affect biodiversity and prevent it from being maintained in good condition.

[10] Law Nr. I-301 on Protected areas adopted by the Seimas of the Republics of Lithuania on 9 of November 1993.

Subsidies as well as inadequate valuation and pricing of state natural resources and natural capital use, in most cases have a negative impact on the environment and biodiversity. Unfortunately, in most cases ecosystem services do not have a market price, or this price does not reflect the real value of the goods and services provided by nature.

In 2014, Smart Continent LT UAB (Research and Consulting alliance) (hereinafter – Smart Continent) conducted a study that identified 37 environmentally harmful subsidies. The largest share of EHS was identified as On-Budget subsidies (national 79 percent and EU-wide 22 percent and support subsidies). The lowest share was identified as Off-Budget subsidies. When evaluating EHS in monetary terms the majority of EHS volume are tax benefits (tax breaks) with 46 percent and EU support (37 percent), and the smallest share is from the national budget (17 percent). The state, as the owner of resources, should ensure the sustainable use of ecosystems and biodiversity and gradually phase out EHS.

Accelerating action to reform, e.g. eliminate, phase out or modify EHS, also harmful to biodiversity, is the priority of the Lithuanian Government (Government of the Republic of Lithuania 2021; MoE 2015). It will start with those that are most harmful to biodiversity, but insignificant in terms of social and economic aspects. Progress made until 2023 consists of [11]:

- Increased excise duty on diesel fuel (from 2024), with the exception of diesel fuel used in agriculture and fisheries (according to set limits and quotas).
- Increased excise duty on heating fuel (diesel).
- Abolition of feed-in tariffs for electricity production in small hydropower plants (from 2025).
- Phase out of exemptions for surface water used by agriculture and farmers (from 2024).
- Introduction of registration tax on machinery used in agriculture (from 2021).
- Parliament's approval of the proposal to link the level of the Road User Charge (RUC) on heavy good vehicles with the EURO standard.
- Inclusion of a CO2 component in the excise duty as of 2025 for all fuels with exemption of natural gas.

The next step is the phasing out of biodiversity-harmful subsidies.

[11] Excise duty Nr. IX-569 adopted by Seimas of Republic of Lithuania, 30 October 2001.

5.7 Conclusions

Policy design should be based on two key principles: polluter pays and cost recovery. The polluter pays principle is enacted to make the party responsible for producing pollution or using natural resources responsible for paying for the damage done to the natural environment. This principle has also been used to put the costs of pollution prevention or natural resource use on the polluter or natural resource user. The polluter pays principle is a simple idea at the core of EU environmental policy: those responsible for environmental damage should pay to cover the costs. Many instruments already exist but their effectiveness is insufficient. Reforming the status quo is necessary to incorporate biodiversity values in decision-making and investments, stimulating environmentally-friendly innovations. Environmental regulation will remain central to addressing pressures on biodiversity ecosystems. A well-defined and comprehensive regulatory framework provides the essential baseline for introducing complementary compensation mechanisms and market-based instruments. It should also guide private sector efforts to develop efficient approaches for damage prevention and remediation by responsible parties. A systematic approach is needed to send accurate price signals about the true value of ecosystem services. Environmental targets can be reached by applying norms and/or introducing or better designing taxes/fees, charges, compensation mechanisms, tradable permits or liable rules. This should be part of a broader fiscal reform in favour of biodiversity.

Lithuania needs to create an efficient system of ecosystem use by setting the right taxes, fees and fines to compensate for the damage done to biodiversity. Such a system would need to have the following characteristics: tax rates are set in such a way, that they reduce the use of scarce resources and generate revenues necessary to finance conservation and preservation of biodiversity. Furthermore, tax revenues can serve as a financial tool, used to compensate for restricted activities in protected areas or damage caused to farmers by wild animals or birds whose hunting is restricted or prohibited. The tax rate or the amount of compensation paid for the restricted activity in protected areas is set, so that it covers the loss of revenues (income) of forest owners, or the damage caused to farmers. The creators of such a system need to ensure the sustainable use of resources, by determining users' responsibility to finance the restoration or to pay a certain amount of money to the state budget, which will then be used for resource recovery.

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List of Acronyms and abbreviations

Acronym / Abbreviation	Explanation
APEC	Asia-Pacific Economic Cooperation
BBergG	German Federal Mining Act
BfN	German Federal Agency for Nature Conservation
BHS	Biodiversity Harmful Subsidies
BMF	German Federal Ministry of Finance
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BNatSchG	German Federal Nature Conservation Act
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CITE	Interministerial Committee for Ecological Transition
EAGF	European Agricultural Guarantee Fund
EEG	Renewable Energy Sources Act
EFA	Ecological Focus Areas
EFR	Environmental Fiscal Reform
EFS	Environmentally Friendly Subsidies
EHS	Environmentally Harmful Subsidies
EPSP	Environmental protection support programme
EstG	Income Tax Act
ETS	Emissions Trading System
EU	European Union
FFS	Fossil Fuel Subsidies
Fig	Figure
FOEN	Federal Office for the Environment (Switzerland)
FÖS	Forum Ökologisch-Soziale Marktwirtschaft e.V.
GBF	Global Biodiversity Framework

Acronym / Abbreviation	Explanation
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicle
IUCN	International Union for Conservation of Nature
KMGBF	Kunming-Montréal Global Biodiversity Framework
LIFE	L'Instrument Financier pour l'Environnement
MEPSSP	Municipalities Environmental Protection Support Special Programme
NBS	National Biodiversity Strategy
OECD	Organisation for Economic Co-operation and Development
OECM	Other Effective Area-based Conservation Measures
PA	Protected areas
PEA	Potentially Eligible Area
RDP	Lithuanian Rural Development programme 2014–2020
RUC	Road user charge
SBSP	State Budget Special Programme
SDG	Sustainable Development Goal
SFAO	Swiss Federal Audit Office
SFE	State Forest Enterprises
Tab	Table
UAA	Utilized agricultural area
UBA	Federal Environment Agency
UN	United Nations
USD	United States Dollar
UStG	Value Added Tax Act
VAT	Value Added Tax
WFD	Water Framework Directive
WTO	World Trade Organisation
WTP	Willingness to pay

Appendix: Meeting Agenda

Programme 13-16 June 2023

Tuesday, 13.06.2023	
Arrival	Ferry crossings from port Lauterbach/Mole at 16:10, 17:10 and 18:10 (last possibility at 20:10)
18:00	*Dinner*
19:30	**Welcoming and introduction** Vera Taborski and Edgar Schütte, BfN

Wednesday, 14.06.2023	
From 07:30	*Breakfast*
I International targets on economic incentives and how to reach them	
09:00	**Implementation of the Kunming-Montréal GBF's target 18 - An overview of the situation in European countries** Friedrich Wulf, Friends of the Earth Europe and Swiss IUCN Committee
10:00	**Integrating ecosystem services into decision making** Virginija Kalesinskiene, Ministry of Environment of the Republic of Lithuania
11:00	*Break*
11:30	**Biodiversity and liability in the EU: A law and economics perspective on remedies** Francesca Leucci, Bologna, Rotterdam and Hamburg Universities (European Doctorate in Law and Economics)
12:30	*Lunch*
13:30	**Guided walk through the nature reserve Isle of Vilm** Meeting Point: Entrance Conference Centre BfN
15:00	**How corporate sustainability reporting can help redirecting monetary flows** Max Kolb, Nature and Biodiversity Conservation Union (NABU) Germany

16:00	*Break*

II Economic incentive settings within Europe

16:30	**Case study Germany: A big turn needs inspiration - perverse subsidies vs. what we could gain when public money will promote biodiversity Magnus Wessel, Friends of the Earth (BUND) Germany**
17:30	**Environmentally harmful subsidies in Germany: Focus on biodiversity** Florian Zerzawy, Forum Ökologisch-Soziale Marktwirtschaft e.V.
18:30	*Dinner*
19:30	**Biodiversity damaging subsidies in Switzerland – overview, reform options and status of current efforts** Lena Gubler, Swiss Federal Institute for Forest, Snow and Landscape Research WSL

Thursday, 15.06.2023

III Economic incentive settings – international perspectives

From 07:30	*Breakfast*
09:00	**A holistic perspective on economic incentives and biodiversity in Africa** Anthony Banyouko Ndah, Plymouth Marine Laboratory & IOC-UNESCO ECOP Africa
10:00	**Perspectives on the foreign economic interest and complex drivers of biodiversity loss in rural Africa: Focus on pangolins and related species** Olusola Adeoya, Nature Cares Resource Centre & IOC- UNESCO ECOP Africa
11:00	*Break*
11:30	**Implications of fiscal policies for biodiversity conservation in India** Amarendra Das, National Institute of Science, Education and Research (NISER)
12:30	*Lunch*

13:30	**Decree 690 of 2021: A new opportunity to conserve Colombian forests** Felipe García-Cardona, Center for Biodiversity Economics and Finance, Humboldt Institute

IV Sector insights: Agriculture and biodiversity within Europe

14:30	**Promises and pitfalls of the EU's Common Agricultural Policy** Mikael Skou Andersen, Aarhus University
15:30	**A systematic analysis of options for agri-environmental policy mixes for multifunctionality** Bartosz Bartkowski, Helmholtz Centre for Environmental Research – UFZ, Department of Economics
16:30	*Break*
17:00	**Institutional analysis of innovative contracts for agri-environmental and climate schemes in Europe** Claudia Sattler, Leibniz-Centre for Agricultural Landscape Research (ZALF)
18:00	*Dinner*
19:00	**Added tax as an instrument for agricultural transformation** Lennart Stein, Faculty for Business Administration, Nuremberg Institute of Technology
20:00	**Discussion and closing remarks** Edgar Schütte & Vera Taborski, BfN
20:30	**Evening programme** get together in the main salon

Friday, 16.06.2023

From 07:30	*Breakfast*
afterwards	**Departure from Vilm to Lauterbach Mole** 07:25 departure boat 1 08:25 departure boat 2 09:20 departure boat 3

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