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The UN Global Biodiversity Framework (Target 18) calls for phasing out incentives that are harmful to biodiversity and the scaling up of nature-positive incentives. The Netherlands is committed to this goal and will assess its public financial incentives to identify potential negative and positive impacts on biodiversity and the environment. The report presents a method to assess the potential impacts of public financial incentives with regard to biodiversity. The core of the method is an expert elicitation protocol, in which experts evaluate the potential impact of incentives on five key drivers of biodiversity loss. The presented method aligns with OECD guidelines and is based on an inventory approach.

Key words: Assessment, Biodiversity Score Card, Biodiversity Harmful Subsidies, Protocol, Public Financial Incentives, Target 18, The Kunming-Montreal Global Biodiversity Framework

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Contents

Preface

In an effort to halt further biodiversity loss, the Netherlands, together with other OECD countries, has committed to achieving target 18 under the Kunming-Montreal Global Biodiversity Framework:

> '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 per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.'

To support countries to implement the above target, the Organisation for Economic Co-operation and Development (OECD) has published a guidance document (OECD, 2022). Building on this, we have developed an assessment protocol to operationalise the OECD's proposed methodology and enable the analysis of a broad range of financial incentives in line with its guidelines. The protocol builds also on insights from existing national approaches—such as those in Italy, Germany, France and Switzerland—and was shared and refined through two pilot sessions and presented in the CBD COP16 in Cali.

We would like to extend our thanks to Maaike Moolhuijsen (LVVN), Hans IJsselstijn (IenW), Deborah Heijblom (RVO) and their colleagues (Interdepartemental Community of Practice T18) for their invaluable support in the development of the protocol. We also acknowledge the contributions of the (international) experts consulted during this process, whose input has been essential to ensuring the protocol's quality and relevance.

This report has been developed by a consortium of Wageningen Social & Economic Research, CE Delft, and the Naturalis Biodiversity Center, commissioned by the Ministry of Agriculture, Fisheries, Food Security and Nature.

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Summary

Biodiversity is declining globally, including in the Netherlands, due to human activities such as land-use change, pollution and overexploitation of natural resources. One important, yet sometimes under-recognised, factor contributing to biodiversity loss is the existence of public subsidies and financial incentives that may unintentionally promote environmentally harmful practices. Recognising this, Target 18 of the UN Biodiversity Framework calls for the identification and phased elimination, reform or redirection of subsidies harmful to biodiversity, while simultaneously scaling up incentives that support the conservation and sustainable use of nature. The Netherlands is committed to this target and will assess its portfolio of public financial incentives to identify potential impacts on biodiversity and the environment.

The report presents a method for assessing the impact of public financial incentives in relation to biodiversity and the environment. The core of the method is an expert elicitation protocol, in which experts evaluate the potential impact of incentives on five key drivers of biodiversity loss. The method follows an inventory-based approach and is aligned with OECD guidelines (OECD, 2022).

The assessment method encompasses national and global biodiversity effects, evaluating both direct and indirect impacts. Experts assess the effects of the expected change in economic activities using the *Biodiversity score card.* The assessment is based on the five drivers of biodiversity loss (land and sea use change, natural resource use and exploitation, climate change, pollution and invasive species), see Figure S.1. The substantiating factors (time, location, character of impact, irreversibility) are used to substantiate the identified effects, specify the affected biodiversity asset, and (if possible) indicate the magnitude of change for each driver.

The report outlines the assessment protocol, covering the preparation phase, expert sessions, and reporting. It also addresses key considerations for improving the accuracy and transparency of the assessment, such as clearly defining public financial incentives and providing insights into the expected changes in economic activities.

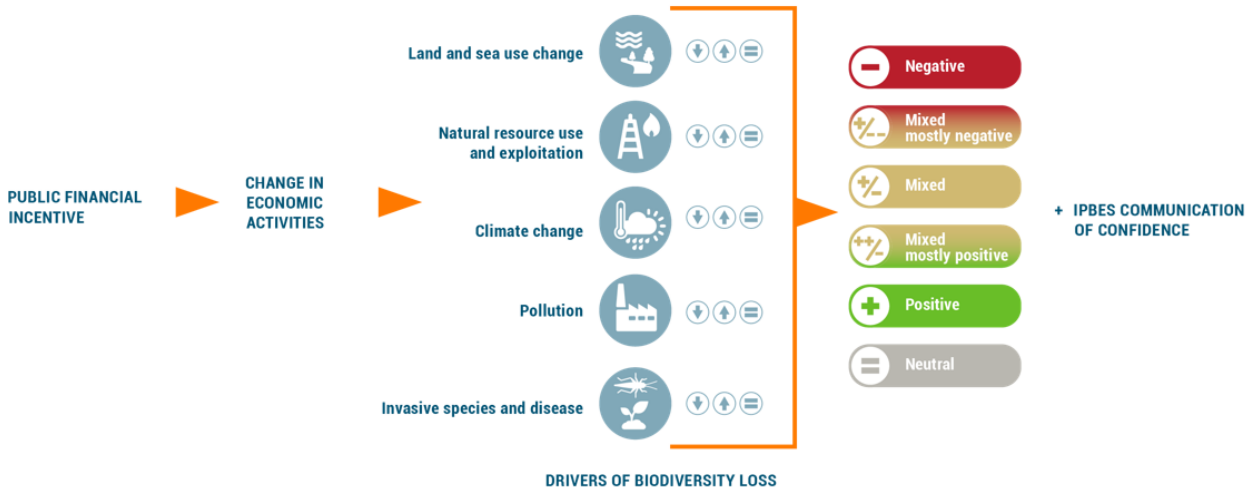


Figure S.1 *Logic of the biodiversity assessment*

1 Introduction

1.1 Process of making public incentives more sustainable in relation to the environment and biodiversity

Biodiversity is under enormous pressure, both globally and in the Netherlands. This pressure is caused by many factors, such as habitat loss for plant and animal species, drought, over-fertilisation, industrialisation, urbanisation, climate change, and the use of pesticides. A change is needed in how we produce, consume, and interact with nature to reverse this trend (Leclère et al., 2020). Halting and reversing biodiversity loss by 2030, as called for under the UN Convention on Biological Diversity's Global Biodiversity Framework, will require scaling up policies to conserve and sustainably use biodiversity, integrating biodiversity into sectoral policies, and increasing finance for biodiversity. In this context, there is an increasing focus on making public incentives more sustainable with regard to biodiversity and the environment.

Globally, subsidies that are harmful to nature and biodiversity now exceed those aimed at conserving biodiversity (WWF, 2024). The report *Can your money do better?* by WWF (2024) highlights the importance of redirecting public financial flows so that they no longer harm the environment and biodiversity. Key conclusions from the WWF-report, particularly in relation to EU subsidies, include:

- EU Member States spend between €34 billion and €48 billion annually on subsidies for activities that potentially harm nature, in the agricultural sector in particular.
- Approximately 60% of the €32.1 billion per year from the EU's Common Agricultural Policy (CAP) supports unsustainable agricultural practices that have potentially been causing the destruction of natural habitats.
- The annual €18 billion funding gap to achieve the EU's 2030 biodiversity strategy could be possibly closed by redirecting harmful subsidies towards nature-positive investments.

This present report is part of the process of the Dutch government to assess their subsidies and other financial incentives (here: public financial incentives) on potential biodiversity and environmental impacts. The impetus for the national assessment stems from commitments made under Target 18 of the Global Biodiversity Framework of the United Nations Convention on Biological Diversity (CBD). During the CBD summit in Montreal in December 2022, the Netherlands committed to 23 targets of the Global Biodiversity Framework (GBF). Target 18 has two main components. The first is the elimination, phasing out or reform of incentives, including subsidies, that are harmful to biodiversity. The second is the scaling up of positive incentives for the conservation and sustainable use of biodiversity. The national assessment also aligns with the phase-out of environmentally harmful subsidies (EHS), which is part of the 8th Environmental Action Program (2020) for the European Union.

This assessment adopts the following definition of biodiversity:

> biodiversity or biological diversity is defined by the Convention on Biological Diversity (CBD) (UN, 1992) as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.'

In recent years, the importance of soil biodiversity in underpinning the functioning of terrestrial ecosystems has been stressed more and more, as well as its key role in the functioning of sustainable agricultural and food systems (see (UN, 2022) and (JRC, 2024)).

This report presents the assessment protocol for the national assessment of the potential impact of public financial incentives on biodiversity and the environment. The goal of this report is to provide a basis for conducting expert assessments of potential biodiversity and environmental impacts in a standardised and

participatory manner across different financial incentives. It also includes alignment with the European Union guidelines and the OECD (2022).

1.2 Operationalising the assessment method

CE Delft (CE Delft, 2024) has developed a method for assessing potential biodiversity and environmental impacts embedded in the OECD guidelines (OECD, 2022). This method has been validated in a workshop with the OECD, EU, and several countries in Paris (December, 2023). This methodology outlines guidelines for how the assessment works methodologically, but needs further elaboration before implementation.

This report operationalises the aforementioned method for the assessment in the Netherlands. This operationalisation includes the development of a protocol for the expert assessment, further development and standardisation of the chosen methodology and the tools and forms to be used in the assessment. This report is part of a preparatory process after which the application of the assessment takes place in the next phase.

The protocol contributes to the consistency of the assessment because:
- The same methodology is used to evaluate all financial incentives.
- The protocol ensures the quality of the implementation of the methodology.
- The protocol guidelines ensure that the results of the assessments based on expert judgments are more comparable.

The protocol facilitates an efficient workflow, allowing a large number of financial incentives to be analysed in a thorough but timely manner, in line with the requirements of the OECD Guidelines.

1.3 The core of the assessment method is expert elicitation

Given the complex nature of assessing biodiversity and the absence of a good standardised impact method to measure biodiversity impacts, expert judgement is central to this assessment. The assessment is going to be conducted through the judgment of five independent external experts per financial incentive, as described in the 'medium' variant of the CE Delft method (CE Delft, 2024). The final judgment is based on the expected impact on the five drivers of biodiversity loss: changing land and sea use, pollution, use and direct exploitation of natural resources, climate change, and invasive species. There is limited or incomplete data available for assessing the effects on biodiversity of the large number of financial incentives. Additionally, expert evaluations are not straightforward and can be prone to cognitive errors (see, for example, Kahneman et al.). To organise the assessment in a standardised and structured way (as much as possible), the protocol is based on systematic analysis steps for decision making (see e.g., Morgan, 2014). This protocol aims to minimise bias and noise in these expert evaluations (Kahneman et al., 2021).

1.4 The assessment method is in line with the OECD guidelines

This assessment method is based on the OECD guidelines for identifying and assessing subsidies and other incentives at the national level (OECD, 2022):
1. scoping (determining which types of financial government incentives are considered)
2. screening (mapping which incentive measures may impact biodiversity, e.g. selecting relevant sectors)
3. data collection (gathering data to prepare for step 4 using a form)
4. assessment (analysing the impact of each incentive based on academic literature).

This protocol for the assessment pertains to steps 3 and 4, the actual assessment, see Figure 1.1. The selection of financial incentives for assessment is the responsibility of the ministries.

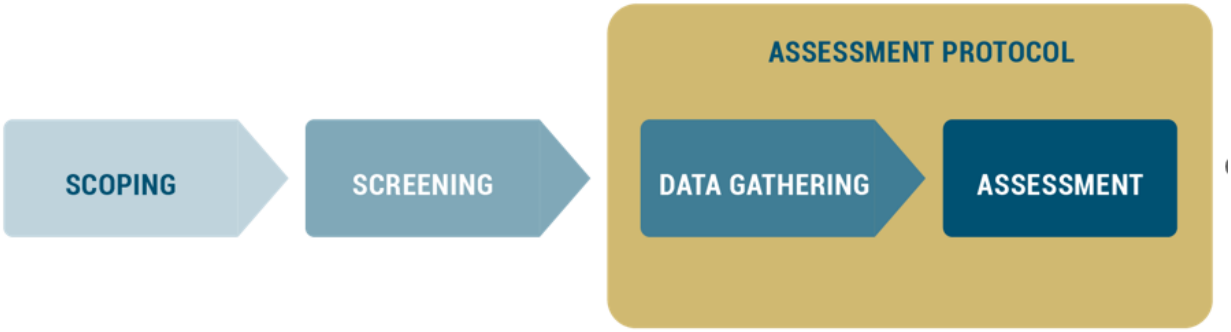


Figure 1.1 *OECD guidelines for Target 18*

1.5 The assessment is based on the inventory approach

Two approaches can be used to assess the impact of financial incentives: the external cost approach and the inventory approach (Brink et al., 2023). The methodology outlined in this protocol is based on the inventory approach. The inventory approach was chosen because it best aligns with the goal of the assessment. According to the inventory approach, the assessment systematically inventories and substantiates the expected impacts of financial incentives on the environment and biodiversity of financial incentives. This is in line with what is needed both for reporting on Target 18 (OECD) and around the process of Environmentally Harmful Subsidies (EU). While sometimes extensive studies are conducted on a single subsidy, the inventory approach makes it possible to assess many financial incentives simultaneously in a thorough way. The advantage of the inventory approach is that it provides insight into both direct and indirect effects on the environment and biodiversity. This approach is applicable on a broad interpretation of the concept of subsidy, referred to here as financial incentives (see Section 4.1).

The ministries gain insight into the potential positive and negative impacts on biodiversity and the environment of the analysed financial incentives, as well as insights into key considerations related to mitigating these impacts. This approach - by also looking at positive impacts - provides input for encouraging environmentally friendly practices or green transitions, rather than eliminating subsidies. For instance, an inventory of the biodiversity impacts facilitates the redesign of a subsidy that supports an agricultural practice for more environmentally friendly practices which does not harm the environment and/or biodiversity.

The inventory approach does not involve analysing the actual public investment to assess the degree of harmfulness of the impact on biodiversity or the environment. In addition, no claims are made about which redesign is most important from the perspective of biodiversity or environmental damage. Measuring the size of the environmental impact requires more understanding of the response to the change, for instance about price sensitivity of demand for product categories, and how demand shifts to other products. A proportionate analysis needs to provide an indication of whether the impact is significant or not, and can also include a general indication of the impacts: in our assessment there is no requirement for detailed research of interrelated impacts to provide highly specific estimates.

1.6 Parallel insights into potential impact on biodiversity and environmental impact

The assessment focuses on environmental and biodiversity impacts in the Netherlands and internationally. The methodology is applicable both to environmentally harmful subsidies and to biodiversity harmful subsidies. The assessment method was initially developed in the context of Target 18 of the Global Biodiversity Framework and specifically addresses impacts on nature and biodiversity. Based on these delimitations, the five drivers of biodiversity loss, namely: changing land and sea use, pollution, use and direct exploitation of natural resources, climate change, and invasive species, have been identified. There is

a large overlap between the drivers of nature and biodiversity loss and the drivers of environmental degradation. Moreover, environmental harmful subsidies have an indirect effect on biodiversity as well. Therefore, the assessment method can be applied to both biodiversity and environmental impacts.

1.7 Scope of protocol

- The assessment method is based on the inventory approach (see e.g., Brink et al., 2024), aimed at identifying the potential positive and negative impacts on biodiversity and the environment of the analysed financial incentives, as well as insights into key considerations related to mitigating these impacts.
- The protocol attempts to facilitate the reporting of biodiversity impacts in a structured way and provides guidelines to standardise the assessment to minimise bias and noise in these expert evaluations.
- Application of the protocol is outside the scope of the report. A pilot expert session was conducted with two financial incentives to test the protocol.
- This protocol operationalises and further develops an existing methodology; no reconsideration has been given in this project to find a better approach.
- Financial incentives are not considered in conjunction, but are evaluated individually for their potential effects on biodiversity.
- The method is not intended to support statements about which reforms are most important from the perspective of biodiversity and environmental damage. The assessment method provides information on biodiversity impacts. For financial incentives reforms by member states, comprehensive considerations of economic, social, and environmental effects are relevant.

1.8 Structure of the report

The protocol for applying the method and the steps to be followed for the preparation, execution, and elaboration of the assessment, are described in Chapter 2. Information on the scientific background and considerations for the implementation of the methodology are outlined in Chapter 3. The forms and tool of the assessment are included in the appendices.

2 Assessment protocol

2.1 Overview of the protocol

This chapter provides an explanation of the expert sessions approach. The assessment protocol, outlined in Figure 2.1, is comprised of three distinct phases.

Phase 1 Preparation (Section 2.3)
This phase covers the preparation of the expert session, including an analysis of the intervention logic of the public financial incentive. This is conducted by the research support team in collaboration with policy makers from the ministries. For the preparation, the *Financial incentive information form* is used, see Appendix 2.

Phase 2 The expert session (Section 2.4)
This phase includes the expert session, which follows a five-step process. Each expert session covers a series of financial incentives and consists of five external experts and the assessment committee. During the expert sessions the *Biodiversity score card* is used, see Appendix 1.

Phase 3 Reporting and quality control (Section 2.5)
This phase includes an independent verification of the assessment (quality control) and summarising the results of the expert session for reporting in line with OECD and EU requirements. This is done by the research support team. For this step the *Table for reporting* is used, see Appendix 3.

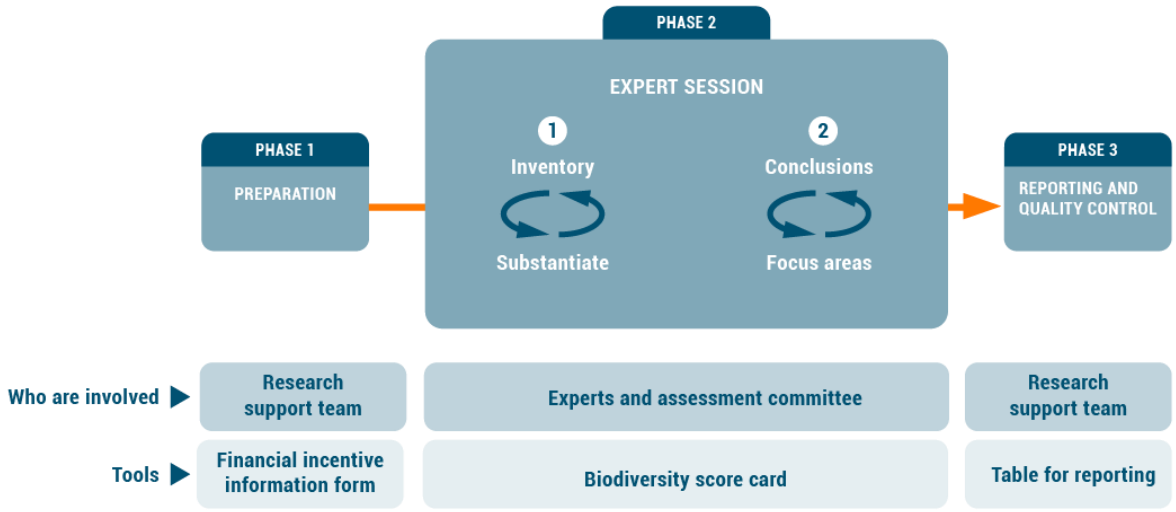


Figure 2.1 *Overview of the protocol*

2.2 Core principles of the protocol

In developing the protocol, we have adopted core principles that guide the design and implementation of the protocol. The principles of the assessment protocol are:

- The guidelines of the assessment method, as described in the CE Delft report (medium variant) (CE Delft, 2024), are authoritative. For a further description and scientific justification of choices in process, method and/or tools, see Chapter 3.
- The public financial incentives analysed in the assessment are selected by the ministries.

- A research support team is appointed to oversee the preparation and reporting and quality control of the protocol and to respond to unanticipated developments. The team consists of core members of the project team. The project team is the team of researchers conducting the assessment.
- An assessment committee is appointed to conduct the expert session. The assessment committee consists of members of the project team. They are responsible for guiding the assessment with the external experts. The committee consists of a facilitator, content coordinator and note-taker. The role of facilitator is preferably filled by the same person for all sessions to achieve consistency.

2.3 Phase 1 Preparation

2.3.1 Information about the financial incentive is inventoried and structured

General information of the financial incentive and information on the intervention logic of the financial incentive is prepared by the research support team in collaboration with the ministries using the *Financial incentive information form*, see Appendix 2. The research support team studies the expected change in economic activities based on desk research. The relevant documents (e.g., the *Financial incentive information form*, assessment protocol) are provided to the experts two weeks in advance, allowing them to prepare for the expert session.

2.3.2 Compartmentalisation and clustering: distribution of financial incentives into expert sessions

The research support team compartmentalises financial incentives in preparation for the expert session, if necessary. This is needed for large financial incentives that break down into several components, which are evaluated separately. A financial incentive should be compartmentalised if it consists of several subcomponents (e.g. sectors) with different expected activities. Furthermore, the research support team will cluster the financial incentives to create an effective expert session format. Approximately four incentives per expert session on the same theme or with the same intervention structure, matching sector expert knowledge.

2.3.3 Selecting experts for the pool of experts

The pool of experts consists of independent professionals from diverse backgrounds who are knowledgeable about the potential impact of financial incentives and the economy on the environment and biodiversity. Two categories of experts are distinguished: environmental economists, and ecologists with an understanding of economic effects. Additionally, experts should have relevant sector knowledge in areas such as agriculture, mobility, energy, housing, and fisheries. The research support team is responsible for ensuring a diverse panel of at least four and no more than six experts per financial incentive.

The following aspects are important when assembling the expert group:
- *Independence*
  Experts involved in the assessment process should come from non-governmental organisations (NGOs) or research institutions.
- *Diversity of expertise*
  Experts should be selected based on their areas of expertise, such as terrestrial or marine ecosystems, and assess incentive measures relevant to these categories.
- *Exclusion of commercial stakeholders*
  Initially, it is advisable not to involve stakeholders from commercial entities in the assessment process, because private sector actors may judge based on more profit-oriented considerations.

It is essential that the experts, as well as those involved from the assessment committee, operate independently and that there is no (appearance of) personal or business involvement with the financial incentive. Experts must be able to provide advice without external influence or consultation, based solely on their expertise. At the start, the assessment committee is informed about the composition of the expert group, and they can raise well-founded objections to the participation of a particular expert based on

involvement. The guiding principle is: 'When in doubt, don't proceed.' The same independence requirements apply to members of the assessment committee as to the experts.

2.4 Phase 2 Conducting the expert session

2.4.1 The assessment committee

In the expert session, the assessment committee fulfils the following roles:

- *Facilitator*
  The facilitator leads the session, ensures that the protocol is followed, and facilitates a meaningful discussion within the available time.
- *Content coordinator*
  The content coordinator is responsible for the substance of the discussion and ensures that the content of the protocol is thoroughly addressed. The content coordinator is the 'public financial incentive owner', meaning knowing the ins and outs of its intervention logic and able to answer expert' questions related to the financial incentive.
- *Note taker*
  The note taker records the discussion and subsequently develops a detailed report.

2.4.2 Structure of the expert session

Within each expert session, the following structure is followed, see Figure 2.2. Steps 1 through 5 are executed iteratively until all financial incentives have been analysed. For very similar incentives, it may be decided to address them together while going through the steps. The clearer the impact of a financial incentive on biodiversity and the environment, the more incentives can be addressed within the same timeframe.

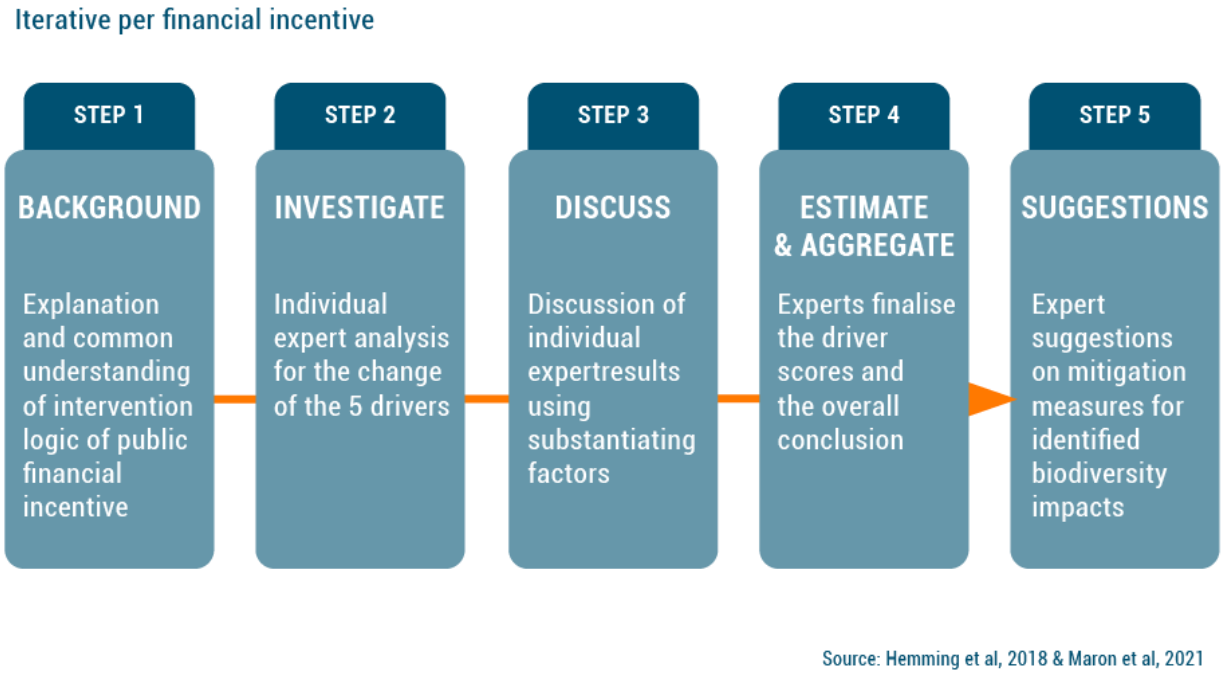


Figure 2.2 *Structure of the expert session*
Source: adapted from Hemming et al. (2018) and Maron et al. (2021).

Table 2.1 *Format of the expert session*

Introduction ***10 min***	**Experts introduce themselves, facilitator discusses the purpose and goals of the meeting, with focus on policy relevance and delineation of goals assessment (an inventory approach and not direct input for a reform agenda), explain the methodology, and outline the scope of the assessment.**
Step 1-5: General structure of the expert session per financial incentive	
• **Step 1**: Explanation and common understanding of expected change in economic activities (direct and indirect) (**Background**) *10 min*	Brief introduction of the public financial incentive under consideration. Experts reach consensus on expected change of activities. If experts anticipate additional activities, these can be added (optional). If necessary, assumptions about the expected change in activities are made at the beginning of the expert session.
• **Step 2**: Expert assessment for the 5 drivers **(Investigate)** *10 min*	Experts individually score the 5 drivers changing land and sea use, pollution, use and direct exploitation of natural resources, climate change, and invasive species (increase, decrease, no change, unknown) with rationale in an online form. A hand-out containing the *Biodiversity score card* is used as support material (see Appendix 1)
• **Step 3**: Discussion of individual expert results **(Discuss)** *10 min*	This is followed by a plenary discussion where substantiating factors (time, location, character of impact, irreversibility) are used to substantiate the identified effects, specify the affected biodiversity asset, and (if possible) indicate the magnitude of change for each driver. A hand-out containing the *Biodiversity score card* is used as support material (see Appendix 1)
• Step 4: Conclusions - Experts finalise the driver scores and the overall conclusion **(Estimate & Aggregate)** *10 min*	Experts finalise the driver scores (increase, decrease, no change, unknown) and the overall conclusion (positive, mixed mostly positive, mixed, mixed mostly negative, negative or neutral). Using the consent methodology, a single biodiversity impact score per financial incentive is assigned. Experts also score the IPBES confidence index (see Section 2.4.6).
• **Step 5**: Suggestions for improvements **(Suggestions)** *5 min*	Brainstorm. This section addresses suggestions from experts for mitigating identified biodiversity impacts or for enhancing positive effects.
Closing *5 min*	Information on follow up steps and closing of the expert session

The expert sessions preferably take place on-site to facilitate effective discussion. On-site session: approximately four financial incentives per session, duration: approximately 3.5 hours. There will be clustering of financial incentives, where incentives with similar nature and context are addressed together in a session. This approach ensures alignment with the required expertise of the experts, as detailed in Section 2.3.3.

2.4.3 Step 1 BACKGROUND: Explanation and common understanding of intervention logic of public financial incentive

Experts reach consensus on expected change of activities. Information on the expected change in economic activities is prepared by the research support team. If experts anticipate additional activities, these can be added (optional). If necessary, assumptions about the expected change in activities are made at the beginning of the expert session.

Expected change in economic activities
Here, we use the term economic activities for the economic effects caused by the financial incentive. Economic activities are for instance an increase in production or consumption within a certain economic sector. These economic effects result in an increase or decrease of the biodiversity drivers and can be direct or indirect.

For example, a subsidy on electric cars will cause a shift from petrol cars to electric cars (direct economic effect). As the latter are responsible for less CO_2 emissions per km, this economic effect will result in a decrease in the emissions of CO_2 by all cars (impact on biodiversity driver). Indirect economic effects of this subsidy may be:

- Extra lithium mining for batteries.
- A lower price for petrol cars on the second-hand market, which may give an incentive to people who do not have a car yet, to buy one; this will lead to more cars on the road.
- A lower price per km for electric car owners may incentivise the usage of these cars and may result in extra kms.
- More damage to roads due to the extra weight of electric cars.

This example shows that indirect economic effects may be quiet drivers.

In the assessment, the change of economic activities is determined relative to the counterfactual/reference situation. A counterfactual reflects the scenario for the national situation in which the public financial incentive is not present.

The time period considered for the expected activities is determined by the nature of the financial incentive:
- Annual subsidies, such as income supplements: the duration of the scheme and whether the effect on the activities is lasting or not.
- Investment measures: the full economic lifespan of the investment.
- Operation of installations with annual support: the full economic lifespan of the installation.

Counterfactual (reference without the financial incentive)
To determine what the effects are of a financial incentive on biodiversity and the environment, a comparison with a counterfactual is necessary. A counterfactual situation reflects the scenario (for the national situation) in which the public financial incentive is not present. A scenario of the economy and its effects on biodiversity without the specific incentive thus serves as the reference. If a policy evaluation has been conducted for the specific financial incentive, the reference in that analysis is used, otherwise it helps to use 'forward looking' (what would the situation be like without this financial incentive?). It is important to clearly indicate which reference situation has been used in the assessment.

2.4.4 Step 2 INVESTIGATE: Individual expert analysis for the change of the 5 drivers

Experts individually score the 5 drivers changing land and sea use, pollution, use and direct exploitation of natural resources, climate change, and invasive species (increase, decrease, no change, unknown) with rationale in an online form. A hand-out containing the *Biodiversity score card* is used as support material (see Appendix 1).

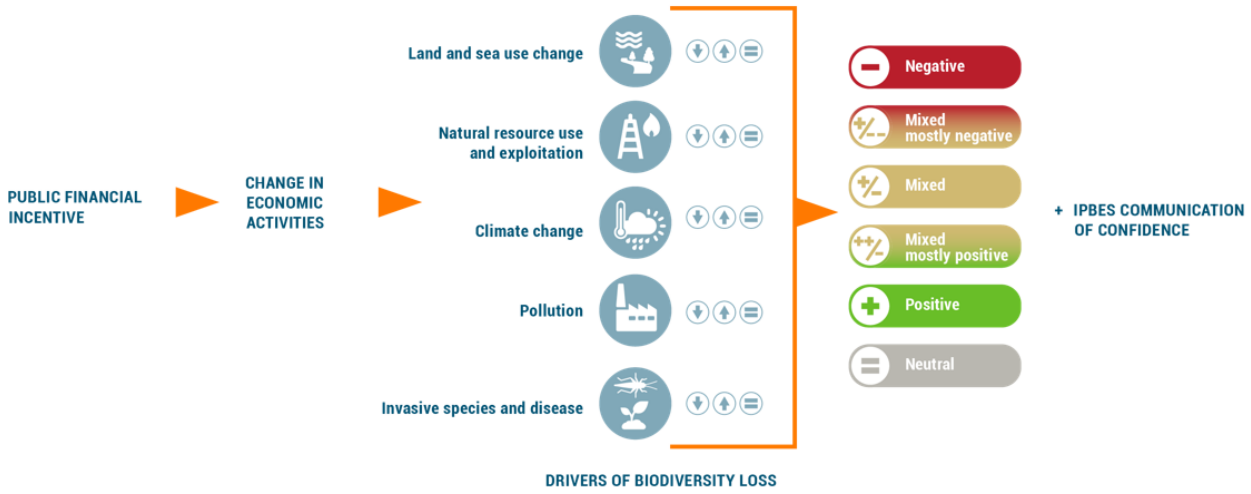


Figure 2.3 *Logic of the biodiversity assessment*

The biodiversity assessment follows the logic outlined in Figure 2.3: 1) identifying the potential change in economic activity (direct and indirect) resulting from the financial incentive compared to a counterfactual, 2) how this change in activity influences a driver of biodiversity loss (increase/decrease/no change/ unknown), and 3) substantiate how the impact on the driver influences biodiversity (using four substantiating factors: time, location, character of impact and irreversibility), and finally 4) arriving at a biodiversity impact score (positive, mixed mostly positive, mixed, mixed mostly negative, negative or neutral).

When applying this logic, the following considerations are important while conducting the biodiversity assessment:

- The assessment includes both domestic impacts on biodiversity within the Netherlands and international impacts beyond its borders.
- The assessment includes negative effects on biodiversity as well as positive effects.
- The assessment takes a broad approach, encompassing the full life cycle of economic activities and their impacts on biodiversity loss drivers. All significant effects are included, with the experts selecting those that are most significant and therefore important to include in the assessment.
- Both direct and indirect economic activities resulting from the financial incentive are considered.

2.4.5 Step 3 DISCUSS: Discussion of individual expert results using substantiating factors

This is followed by a plenary discussion where substantiating factors (time, location, character of impact, irreversibility) are used to substantiate the identified effects, specify the affected biodiversity asset, and (if possible) indicate the magnitude of change for each driver.

Experts assess the effects of the activities on each driver using the *Biodiversity score card* (see Appendix 1). For those effects the experts then assess the impact on the five drivers, indicating whether a driver is decreased, increased, not changed, or unknown. The effects of activities on biodiversity loss drivers are further substantiated by the experts using the following factors: a) time, b) location, c) character of impact and d) irreversibility. These factors are defined in Section 3.4 and provide context to the driver score, see Figure 2.4.

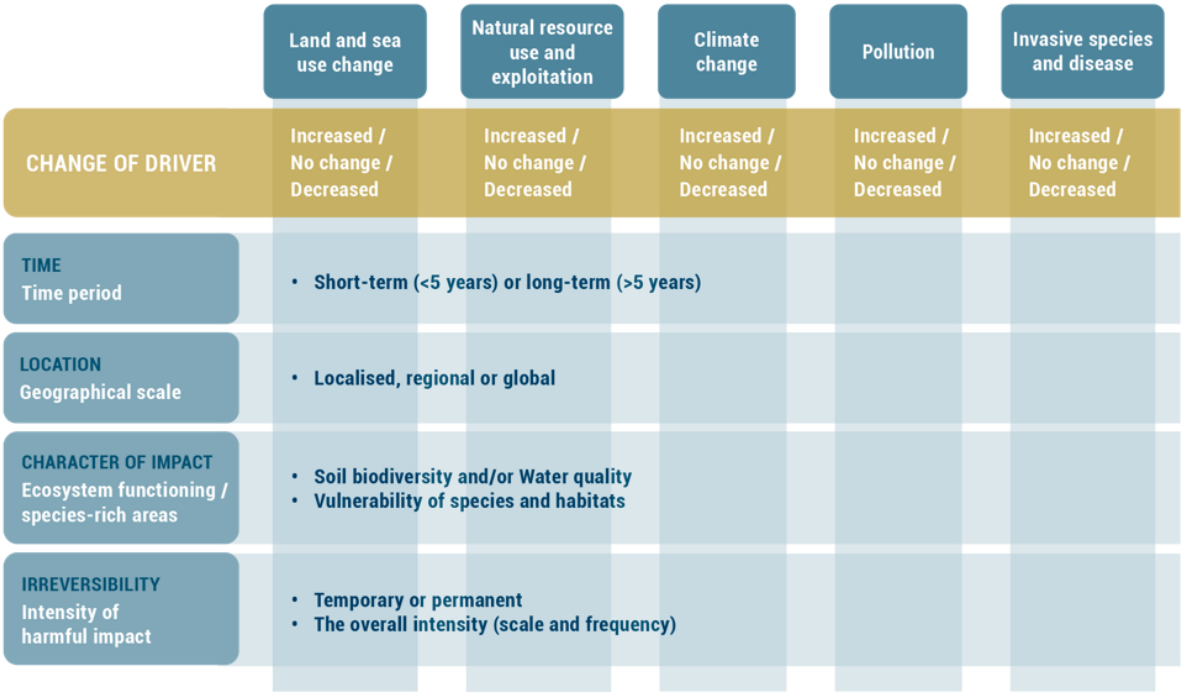


Figure 2.4 *outlines the four factors that are relevant for each biodiversity loss driver*

2.4.6 Step 4 ESTIMATE & AGGREGATE: Experts finalise the driver scores and the overall conclusion

Experts finalise the driver scores (increase, decrease, no change, unknown) and the overall conclusion (positive, mixed mostly positive, mixed, mixed mostly negative, negative or neutral). Consensus impacts are described, with discussion only if scores differ significantly. Using the consent methodology, a single biodiversity impact score per financial incentive is assigned. Experts also score the IPBES confidence index.

Reaching a collective biodiversity impact score
After assessing the drivers with contextual underpinning to interpret the type and degree of biodiversity degradation, a overall biodiversity impact score is determined on a five-point scale. The score can be negative, mixed mostly negative, mixed, mixed mostly positive, positive or neutral.

A financial incentive is considered a positive biodiversity impact score if it does have a positive impact on the drivers and no negative impacts on the drivers. Conversely, a negative biodiversity score means a negative impact on the driver, and the absence of positive impacts. A mixed biodiversity impact score occurs when an activity both increases and decreases drivers. For this latter category the experts may still determine that an incentive falls under mixed mostly positive or mixed mostly negative based on the substantiating factors.

The driver scores cannot be added up or weighted against each other. The effects vary, and one driver may have a much larger impact than another. For example, the drivers land and sea use change, natural resource use and exploitation generally have a greater significance in terms of biodiversity impacts, than the drivers climate change and invasive species and disease (see Section 3.2). Therefore, the experts provide their own estimates for the biodiversity impact score taking into account the aforementioned considerations.

IPBES confidence score
During the expert session, experts assign an IPBES confidence index to the overall biodiversity impact score. In the assessment, this IPBES score is added to understand the certainty of the expert opinion. It avoids overstating certainty, especially when data is limited. By clearly indicating the level of confidence, experts help policymakers distinguish between well-founded conclusions and areas that require caution due to uncertainty.

Assigning a confidence score is based on the following guidance document (IPBES, 2018). Confidence refers to how strongly experts can assert a particular finding based on the type, quantity, quality and consistency of the evidence (the existing peer reviewed literature and grey literature, etc) as well as the level of agreement (the level of concurrence in the data, literature and amongst experts, not just across the expert team). Both these facets can be scored as being either low or high, leading to one of the four confidence terms as described in Figure 2.5, where:
- Well-established: comprehensive meta-analysis or other syntheses/multiple independent studies that agree.
- Established but incomplete: general agreement although only a limited number of studies exist but with no comprehensive synthesis, or the studies that do exist imprecisely address the question.
- Unresolved: multiple independent studies exist but conclusions do not agree.
- Inconclusive: existing as or based on a suggestion or speculation; no or limited evidence.

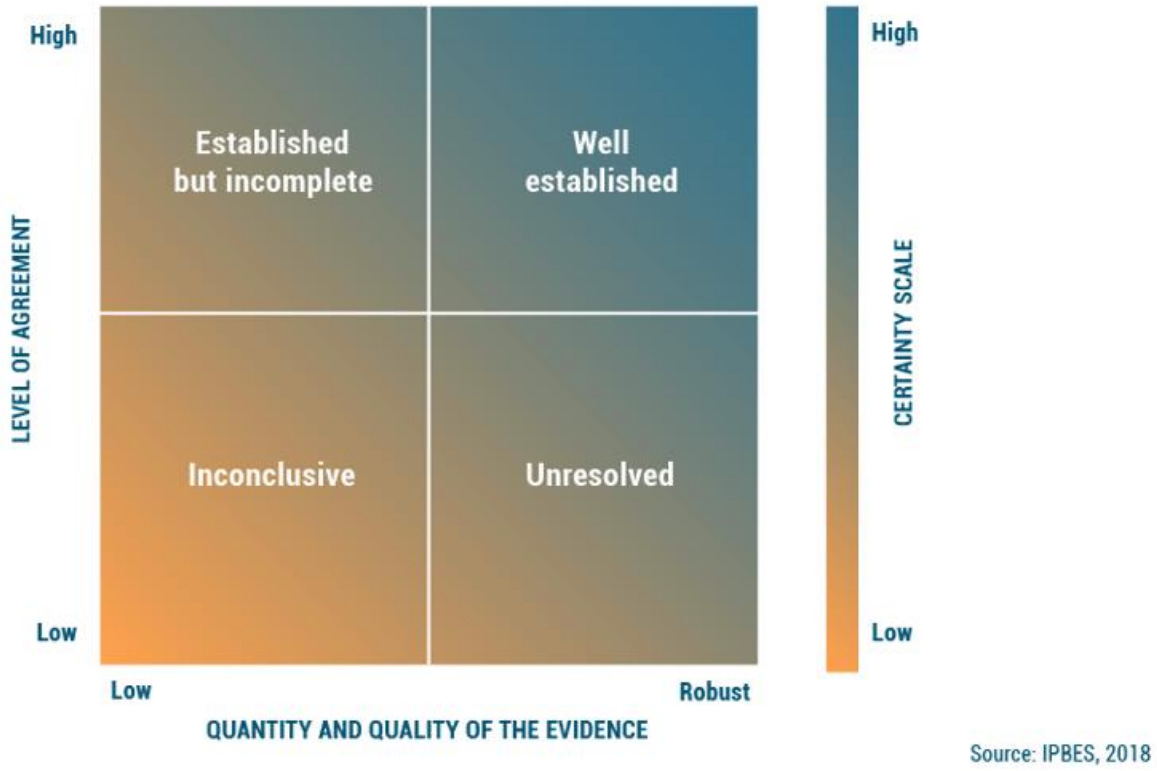


Figure 2.5 *IPBES confidence score*
Source: IPBES (2018).

2.4.7 Step 5 SUGGESTIONS: Expert suggestions on mitigation measures for identified biodiversity impacts

This step addresses suggestions from experts for mitigating identified negative effects on biodiversity or for enhancing identified positive effects on biodiversity. For financial incentives with a positive biodiversity impact score, this might involve what conditions are necessary for maintaining this positive assessment. For financial incentives with a negative biodiversity impact score, it might involve what conditions should be met or what mitigating measures could be implemented. The assessment pays attention to expert insights on these conditions and mitigating measures, because experts with knowledge on biodiversity impacts have an understanding of these mitigating measures. This input is valuable information for the next step after the assessment where opportunities for redesigning are considered.

Based on the biodiversity impact score, possible re-design priorities can be derived. According to (BIOFIN, 2024) possible re-purposing options are: 1) Greening and repurposing subsidies; 2) Reducing the value of subsidies; 3) Phase out subsidies; and 4) making minor modifications of the most harmful elements.

Based on this assessment, no statements can be made about how to re-design public financial incentives. Possible economic and social trade-offs should be taken into account when designing the reform. Transitional pathways, such as those associated with phasing out investment support, must also be taken into account. Re-design must be based on the interdependence of different incentives (policy-packages). And finally, feasibility needs to be considered.

2.5 Phase 3 Reporting and quality control

2.5.1 Summarising assessment results for reporting

During the expert sessions, the experts complete an online form and session minutes are compiled by the note-taker. After the session, *Table for reporting* in Appendix 3, is completed by the research support team. Reporting is by compartmentalised financial incentive, sources and references are added where possible. Both the report of the expert session and the completed table for reporting are shared with the experts for a final check of the correct display of the session.

3 Considerations of the assessment methodology

Expert evaluations are not straightforward and can be prone to cognitive errors (see, for example, (Kahneman et al., 2021). Such assessment errors, biases, or preconceptions need to be minimised as much as possible (see (Hemming et al., 2018)). Therefore, this assessment protocol is derived from the IDEA approach (Hemming et al., 2018 and Courtney Jones et al., 2021). It is characterised by two rounds in the expert session (O'Hagan, 2019). In the first round the expert make individual judgements. These are then discussed with a focus on understanding the reasons for different opinions. In the second round the experts then have the opportunity to revise their scores. The group then agrees on 'consensus' conclusions on the impact on biodiversity. This approach requires an independent discussion leader, here: facilitator, to guide the discussion and address possible sources of bias in the expert opinions.

This chapter provides background information to the detailed protocol presented in Chapter 2. This includes the scientific rationale underpinning the chosen methodology and approach providing a clear justification for choices made.

3.1 Defining public financial incentives for assessment

In the protocol, generally the term 'financial incentives' is used for subsidies. There are multiple interpretations of the term 'subsidy' within the context of harmful subsidies. The definition provided by the OECD is the most widely used (OECD, 2005):

> 'In general, a subsidy is the result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs.'

Since this refers to government action, non-internalised externalities are not covered by the definition of a subsidy. These are associated with market failures rather than government failures. In the assessment, we adopt this broad OECD definition, while narrowing it down by considering only financial incentives and not focusing on regulations.

Financial incentives/subsidies for the protocol are understood more broadly than just the explicit transfer of funds by the government to market participants (this is in line with Brink et al., 2024). We follow the BIOFIN/UNDP (2024) classification of subsidies, which distinguishes the following categories: direct transfers of fund, indirect transfers, fiscal incentives, other foregone government revenues, and transfer of risk to the government (see Table 3.1).

The scoping and screening phases (OECD, 2022) were not part of this project. The scoping phase determines which types of subsidies are included in the analysis and may vary between ministries. Similarly, the screening phase needs to be conducted within the specific context of each Dutch ministry, which can lead to differing screening approaches. It is therefore important to clarify the approach to scoping and screening in the results report. This will enable a proper interpretation of inter-ministerial differences and support meaningful comparison of results across various types of incentives and subsidies.

Table 3.1 *Overview of type of financial incentives/subsidies (BIOFIN/UNDP, 2024)*

Type of Financial Incentive/Subsidy	Examples
Direct transfers of funds	• Targeted spending through government budget at different levels (e.g. research) • Government-owned enterprises (at varying degrees of ownership)
Indirect transfers	• Price interventions • Price incentives (mainly consist of border measures)
Fiscal incentives	Fiscal support such as special exemptions, deductions, rate reductions, rebates, credits and deferrals that reduce costs • Subsidies based on output • Subsidies based on input (e.g. VAT exemption) • Subsidies based on factors of production (e.g. lump-sum payments to all farmers)
Other foregone government revenue	• Subsidies based on output • Subsidies based on input (e.g. VAT exemption) • Subsidies based on factors of production (e.g. lump-sum payments to all farmers)
Transfer of risk to government	• Credit support • Insurance • Transfer of environmental costs to the government

3.2 Assessment based on the five drivers of biodiversity loss

The core of the biodiversity assessment is based on the five drivers of biodiversity loss as defined in IPBES (2019). As seen in Figure 3.1, IPBES (2019) identifies five drivers of biodiversity loss, in the following order in which they contribute to biodiversity loss (one being most and five being least, on global average):

1. *Land/sea-use change*
   Land use change refers to the modification or management of natural environments into human dominated environments, such as settlements, semi-natural and agricultural areas. Sea-use changes includes involves coastal development, offshore aquaculture, mariculture and bottom trawling (IPBES, 2019). Land-use change is the primary human impact on habitats.
2. *Direct exploitation of natural resources (23%)*
   Direct exploitation of natural resources is the consumptive use of any natural resources. This includes water use. Overharvesting of resources results in population declines and threatens species with extinction. Human exploitation of wildlife has been a constant throughout history, contributing to biodiversity loss and species extinctions. However, the current rate of species decline has escalated significantly. Among the most overexploited are marine fish, invertebrates, trees, tropical vertebrates hunted for bushmeat, and species targeted for the medicinal and pet trades (IPBES, 2024).
3. *Climate change*
   A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. Alterations in climate and weather patterns is impacting in situ ecosystem functioning and causing the migration of species and entire ecosystems. Climate change-induced temperature increases may threaten as many as one in six species at the global level. In marine environments, rising atmospheric CO_2 concentrations are leading to higher ocean temperatures and acidification, particularly impacting coral reefs and deep-sea communities.
4. *Pollution*
   Pollution is the introduction of contaminants into the natural environment that cause adverse change. Indicators may be non-GHG air pollution, soil pollution, water pollution, waste and other disturbances such as light and noise (TNFD). Pollution is a key driver of biodiversity loss across all biomes, with particularly severe impacts on freshwater and marine habitats. Nitrogen deposition is recognised as a major threat to biodiversity; in terrestrial environments, nitrogen from fossil fuels and fertilisers slows decomposition and hinders microbial activity. In freshwater and marine ecosystems, nitrogen-phosphorous fertilisers have even more harmful effects, leading to eutrophication and oxygen-depleted 'dead zones' where aquatic life cannot survive (IPBES, 2024).

5. *Invasive species*
   Species whose introduction and/or spread by human action outside their natural distribution threatens biological diversity. Invasive species, both native and alien, disrupt ecosystems in terrestrial, marine, and freshwater environments, often outcompeting local species for resources or spreading disease that native species have no immunity for. These species have caused biodiversity loss at local and regional levels, as well as significant economic damage worldwide (IPBES, 2024).

   Note: Threats are not clearly aligned to any of these five main drivers (e.g., fire, human disturbance, recreational activities, and tourism) account for the remaining 9% (IPBES, 2019). The other drivers are not the focus of the assessment.

The above direct drivers listed above cause changes in ecosystems, species populations, and natural habitats, resulting in the degradation of biodiversity. In line with IPBES, the assessment defines ecosystems types as 1) terrestrial ecosystems (forests, grasslands, savannas, deserts and tundras), 2) freshwater ecosystems (rivers, lakes, wetlands, and other inland water systems) and 3) marine ecosystems (coastal systems, shelf ecosystems, open ocean and deep-sea environments).

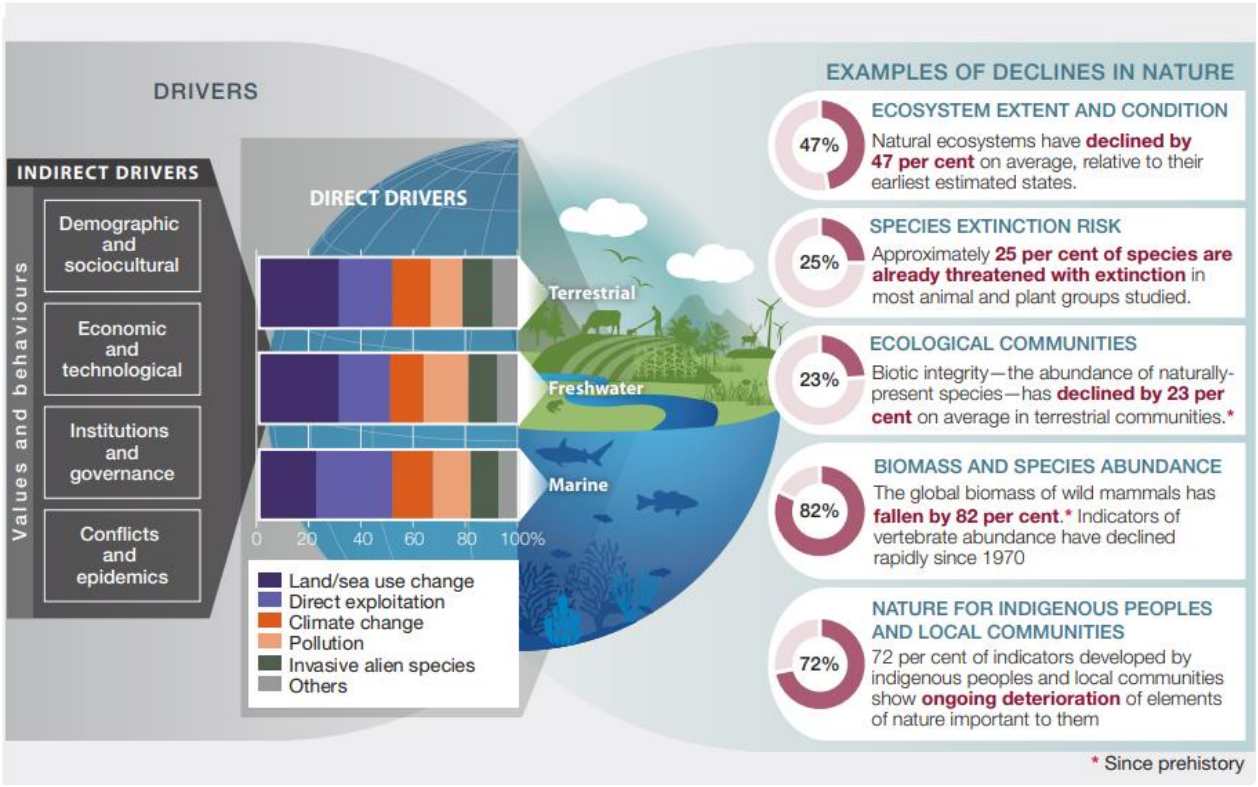


Figure 3.1 *Examples of global declines in nature, emphasising declines in biodiversity, that have been and are being caused by direct and indirect drivers of change*
Source: IPBES, (2019).

It is important to note that the relative contribution of the drivers of biodiversity loss varies between regions and ecosystems. For example, land-use change has the greatest impact on terrestrial and freshwater ecosystems while direct exploitation (mainly fish) is more important in marine environments. The relative contribution of different drivers for different ecosystems is further illustrated in Figure 3.2. This shows that the ecosystem affected and is important and may play a role in weighing different of different drivers for the biodiversity impact score by experts (also see substantiating factors in Section 3.4).

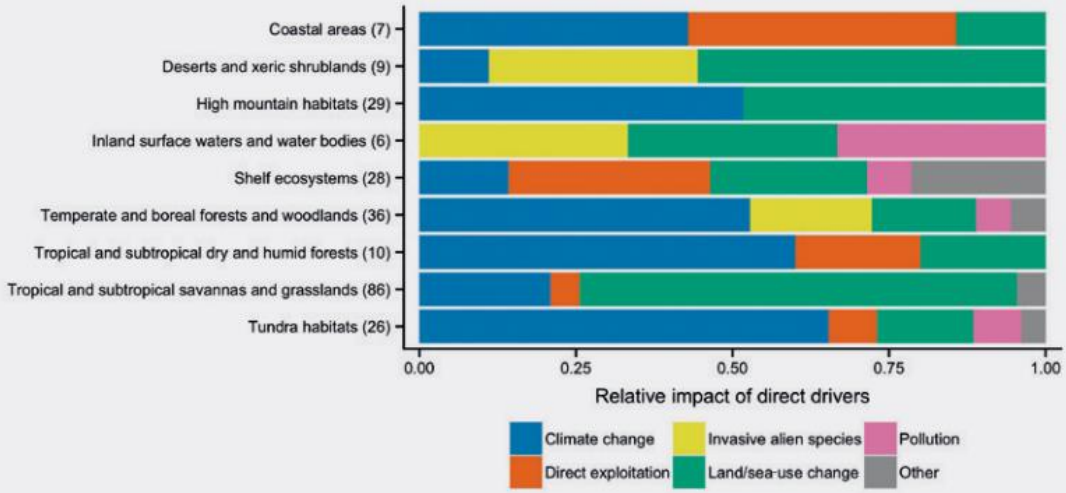


Figure 2 2 24 **Attribution of changes in different ecosystems (rows) to direct drivers (colour bars) compiled from IPLC observations worldwide based on 470 reviewed local IPLC indicators (see Appendix CC).**

Numbers in brackets are numbers of indicators with driver attribution. Relative impact of direct drivers is shown as their relative frequency in the reviewed studies. The category "other" includes threats that were identified for some ecosystems during the collection of data but are not clearly linked to the five main categories (e.g. vegetation encroachment, disease and insect outbreaks).

Figure 3.2 *Attribution of changes in different ecosystems (rows) to direct drivers (colour bars) compiled from IPLC observations worldwide based on 470 reviewed local IPLC indicators*
Source: IPBES (2019).

3.3 Impact on biodiversity; the link between potential activities and changes of drivers

The link between (potential) activities resulting from financial incentives and changes in the drivers should be made explicit during the expert sessions. Basically, this is a description of how the activity affects the driver. If applicable, this includes a justification of which type of ecosystem is affected: terrestrial, freshwater or marine (IPBES, 2019), as well as how the change in the driver leads to biodiversity loss, no effect or increase. As an example, (BIOFIN, 2024) outlined potential (negative) biodiversity impacts in key sectors, shown in Table 3.2 below. This shows examples of the effective linkage of activities to a change in biodiversity drivers, such as the increased GHG emissions in the case of subsidised fuel in the transport sector, leading to increased travel and vehicle use which causes ocean acidification, affecting fauna and flora that are sensitive to pH imbalances.

Table 3.2 *Potential negative biodiversity impacts of subsidies in key sectors, connecting direct biodiversity drivers to the different facets of biodiversity impact (BIOFIN, 2024). Adapted to include the effect on driver more specifically, better aligning with this assessment method*

Sector	Public financial incentive	Expected change in economic activity	Driver	Effects on driver	Potential biodiversity impacts
Agriculture	Supporting an increase of production	Increased agricultural use of chemical inputs, mechanization and irrigation (intensification)	• Pollution • Natural resources use & exploitation	• Pollution is increased, due to direct and indirect effects of eutrophication by pesticides and fertilizers • Increased exploitation of resources, due to drainage, irrigation, cultivation techniques and reduction in the fallow period	• Loss of non-target species, including pollinators • Degradation of freshwater, marine and terrestrial ecosystems • Loss of natural habitats • Soil degradation and erosion
Fisheries	• Supporting an increased fishing effort by reducing operating costs (e.g. fuel subsidies, tax exemption) and enhancing revenues (guaranteeing a fixed price for catch). • Implementing programmes that increase capacity by reducing the cost of capital for fleet expansion and modernization (e.g. through vessel buy-back schemes, low interest loans, loan guarantees, grants).	• Increased fishing capacity and effort (longer fishing ranges and the purchase of larger vessels) • Increased consumption by reducing prices • Increased fishing effort by non-viable businesses.	• Natural resources use & exploitation • Sea use change	Unstainable fishing level leading to: • increased mortality of target and bycatch species • physical impact on the habitat of benthic organisms caused by bottom trawling • The direct effects of fishing also have indirect implications for other species. Fisheries remove prey that piscivorous fishes, birds and mammals would otherwise consume, or may remove predators that would otherwise control prey populations	• Loss of species; increased mortality of target and bycatch species, and indirect implications for other species • Loss of natural habitats; physical impact on the habitat of benthic organisms
Transport	Subsidizing fuel	Increased travel and vehicle use	Climate change	• Increased climate change due to increased GHG emissions. • Acidification of the ocean	• Biodiversity is affected (direct & indirect) by the impacts of global warming • Fauna & flora that are sensitive to PH are negatively affected
	To build roads	More roads built	Land use change	Increased land-use change	• Increased habitat losses and fragmentation • Increased deforestation in remote areas
Energy	Subsidizing fuel	Increased use of energy	Climate change	Increased climate change due to increased GHG emissions	• Biodiversity is affected (direct & indirect) by the impacts of global warming • Fauna & flora that are sensitive to PH are negatively affected
Water	Providing water price subsidies and indirect water subsidies	Water overuse and wastage due to below-cost pricing	Natural resources use & exploitation	Increased direct exploitation of resources resulting in water stress.	• Loss of biodiversity due to falling water tables and erosion • Loss of biodiversity due to a lack of available water and food for wildlife

3.4 Substantiating the biodiversity impact score

As noted in Section 2.3, it is important in this assessment methodology to provide justification and context for the estimated effects on the drivers and the resulting impacts on biodiversity. This substantiation helps experts to rationalise how different drivers impact biodiversity and which specific aspects of biodiversity are affected. While this assessment does not employ an impact scoring scale (e.g., low, medium, high) as used in other national assessments (Switzerland, Gubler et al. (2020) and Germany, FÖS Marktwirtschaft (2021)), several of the indicators listed below were utilised in these assessments to determine the degree and nature of the impact on the drivers. Contextualisation is also an important aspect in the guidance for identifying and assessing of nature-related issues (see also the TNFD LEAP approach, TNFD (2023)).

In the assessment method the following 'substantiating factors' can provide context and help to rationalise the scores given in an expert session:

- *Temporal considerations (Time period)*
  The duration of an activity's effect on drivers of biodiversity loss can range from short-term (<5 years) to long term (>5 years). This includes potential time lags, cumulative impacts, thresholds and tipping points (TNFD, 2023). Ecosystems also vary in their recovery times; some, like forests, may take decades or centuries to recover, while others, such as grasslands, may bounce back more quickly. These differences influence how biodiversity is impacted over time (IPBES, 2019)
- *Spatial considerations (location; geographical scale)*
  Certain areas are more vulnerable to activities than others, particularly ecologically sensitive areas such as wetlands, forests, or alpine zones (Millennium Ecosystem Assessment, 2005). Effects can be localised (e.g. emission of excess nutrients such as nitrogen, which have different impact on biodiversity depending on the ecosystem where it takes place), regional (e.g. the effects of persistent toxic substances may spread over a wider area), or global (e.g. emissions contributing to climate change will have a global effect, it does not matter where CO_2 is emitted) (PBAF, 2022). Local practices and contexts can influence environmental impacts (e.g. irrigation support in water-scarce vs water-abundant areas) (Cash et al., 2006).
- *Impact characterisation*
  Two types of impacts are considered: 1) Impact on ecosystem function (taking into account soil biodiversity and water quality). In recent years, the importance of soil biodiversity in underpinning the functioning of terrestrial ecosystems has been stressed more and more, as well as its key role in the functioning of sustainable agricultural and food systems (see UN (2022) and JRC (2024)), and
  2) vulnerability of species and habitats: Species and habitats differ in their resilience to environmental changes caused by incentives. Rare and endangered species, like those on the Red List (International Union for Conservation of Nature, 2021) and keystone species, which have a disproportionate influence on their ecosystems, are particularly vulnerable. Habitats such as wetlands, alpine regions, and old-growth forests often contain species that are sensitive to even slight disturbances, making them more susceptible to biodiversity loss.
- *Irreversibility and intensity*
  The intensity of the biodiversity effect can vary based on whether it is temporary or permanent. The overall intensity also depends on the scale and frequency of the damaging activity, with larger-scale, frequent disruptions generally causing more intense impacts on ecosystems.

By evaluating these four factors for each driver, the assessment can provide a more nuanced understanding of the impact on biodiversity and interpreted the biodiversity scores in relation to the degree of change.

3.5 Providing insight into the expected change in economic activities

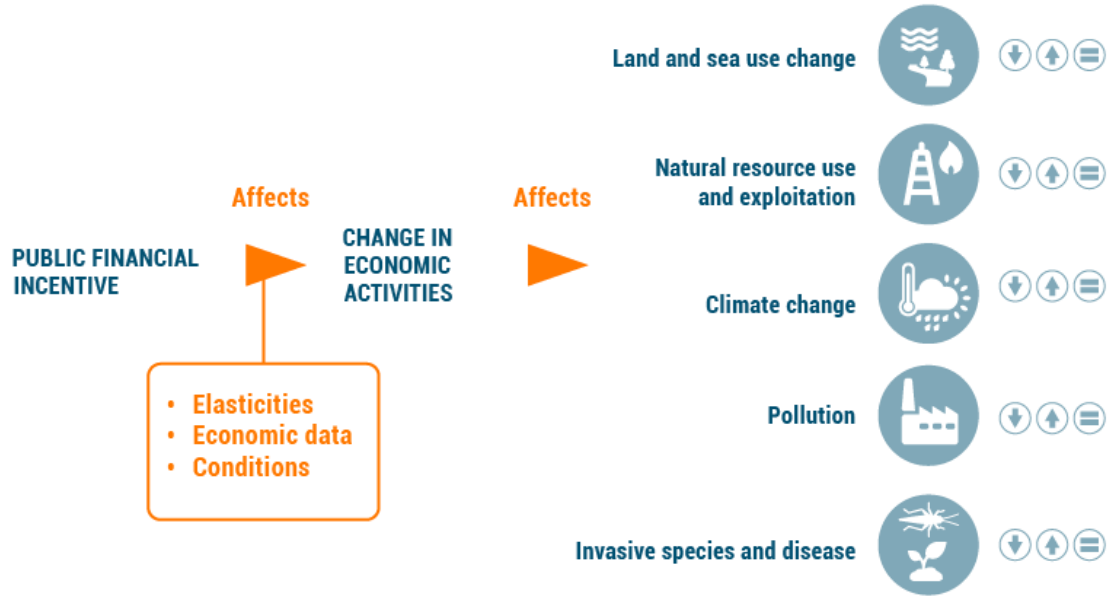


Figure 3.3 *An overview of the analysis of change in economic activities as a prerequisite for the assessment*

> 'An economic activity takes place when resources such as capital goods, labour, manufacturing techniques or intermediary products are combined to produce specific goods or services. Thus, an economic activity is characterised by an input of resources, a production process and an output of products (goods or services).' (EUROSTAT, 2024)

The potential economic activities of a financial incentive will sometimes difficult to estimate for experts, some complexities here include:

- Market responses can lead to outcomes that are difficult to oversee given complexity of markets. There is sometimes insufficient data on the potential economic impacts of activities as a result of a public financial incentive in terms of market responses and elasticities. Consider, for example, the water rebound effect, which means that water resource savings expected from subsidised water efficiency improvements may be partly or wholly offset by increased water demand (also known as Jevon's paradox; see Silvis and van der Heide, 2013).
- There are also contextual circumstances that affect the potential change in economic activity. Local practices and contexts can affect environmental impacts. For example, support for irrigation in water-scarce versus water-abundant areas.
- Implementation conditions (e.g. cross-compliance) are essential: are these attached to payments or non-binding? Are these conditions respected by the beneficiaries, e.g. farmers, and well controlled?

Sources and literature

BIOFIN. (2024). *The nature of subsidies: A step-by-step guide to repurpose subsidies harmful to biodiversity and improve their impacts on people and nature*. U. N. D. Programme.

Brink, C., Vollebergh, H., Trinks, A., and Zwaneveld, P. (2024). *Abolishing fossil fuel subsidies: a brain teaser rather than a no-brainer*.

Cash, D.W., Adger, W.N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L., and Young, O. (2006). Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. *Ecology and Society, 2006*(2). http://www.ecologyandsociety.org/vol11/iss2/art8/

CE Delft. (2024). *Assessing biodiversity effects of public financial incentives. A methodology for the Dutch government*. https://ce.nl/publicaties/assessing-biodiversity-effects-of-public-financial-incentives/.

FÖS Marktwirtschaft. (2021). *Environmentally Harmful Subsidies in Germany: Focus on Biodiversity*. F. Ö.-S. M. (FÖS). https://foes.de/publikationen/2021/2021-05-11_FOES-Subsidies_Biodiversity_EN.pdf.

Gubler, L., Ismail, S., and Seidl, A. (2020). *Biodiversitätsschädigende Subventionen in der Schweiz*. Grundlagenbericht. https://www.dora.lib4ri.ch/wsl/islandora/object/wsl:26594.

Hemming, V., Burgman, M.A., Hanae, A.M., McBride, M.F., and Wintle, B.C. (2018). A practical guide to structured expert elicitation using the IDEA protocol. *Methods in Ecology and Evolution, 2018*(1), 169-180.

International Union for Conservation of Nature. (2021). *The IUCN Red List of Threatened Species* Version 2021-3). https://www.iucnredlist.org.

IPBES. (2018). *IPBES Guide on the production of assessments*. https://doi.org/10.5281/zenodo.7568074.

IPBES. (2019). *Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. I. secretariat. https://www.ipbes.net/global-assessment.

IPBES. (2024). *Models of drivers of biodiversity and ecosystem change*. https://www.ipbes.net/models-drivers-biodiversity-ecosystem-change.

JRC. (2024). *Soil Biodiversity*. https://esdac.jrc.ec.europa.eu/themes/soil-biodiversity.

Kahneman, D., Sibony, O., and Sunstein, C.R. (2021). *Noise: A flaw in human judgment*. Hachette UK.

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Island Press.

Morgan, M.G. (2014). Use (and abuse) of expert elicitation in support of decision making for public policy. *Proceedings of the National academy of Sciences*, 2014(20), 7176-7184.

O'Hagan, A. (2019). Expert Knowledge Elicitation: Subjective but Scientific. *The American Statistician, 2019*(1), 69-81. https://doi.org/10.1080/00031305.2018.1518265.

OECD (2022). *Identifying and assessing subsidies and other incentives harmful to biodiversity*. O. Publishing. https://www.oecd-ilibrary.org/docserver/3e9118d3-en.pdf?expires=1708435641&id=id&accname=guest&checksum=CE67A6850B746B73D6F0C5D1A5365532.

PBAF (2022). *Taking biodiversity into account: PBAF Standard v2022 Biodiversity impact assessment - Footprinting*. https://pbafglobal.com/files/downloads/PBAF_FP2022.pdf.

TNFD (2023). *The guidance on the identification and assessment of nature-related issues: the TNFD LEAP approach*.

UN (1992). *Convention on Biological Diversity*. https://wedocs.unep.org/bitstream/handle/20.500.11822/8340/-Convention%20on%20Biological%20Diversity,%20June%201992-19923086.pdf?sequence=2&amp%3BisAllowed=

UN (2022). *Convention on Biological Diversity*. https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-28-en.pdf.

Appendix 1 Biodiversity scorecard

Biodiversity Score Card Name: Date:

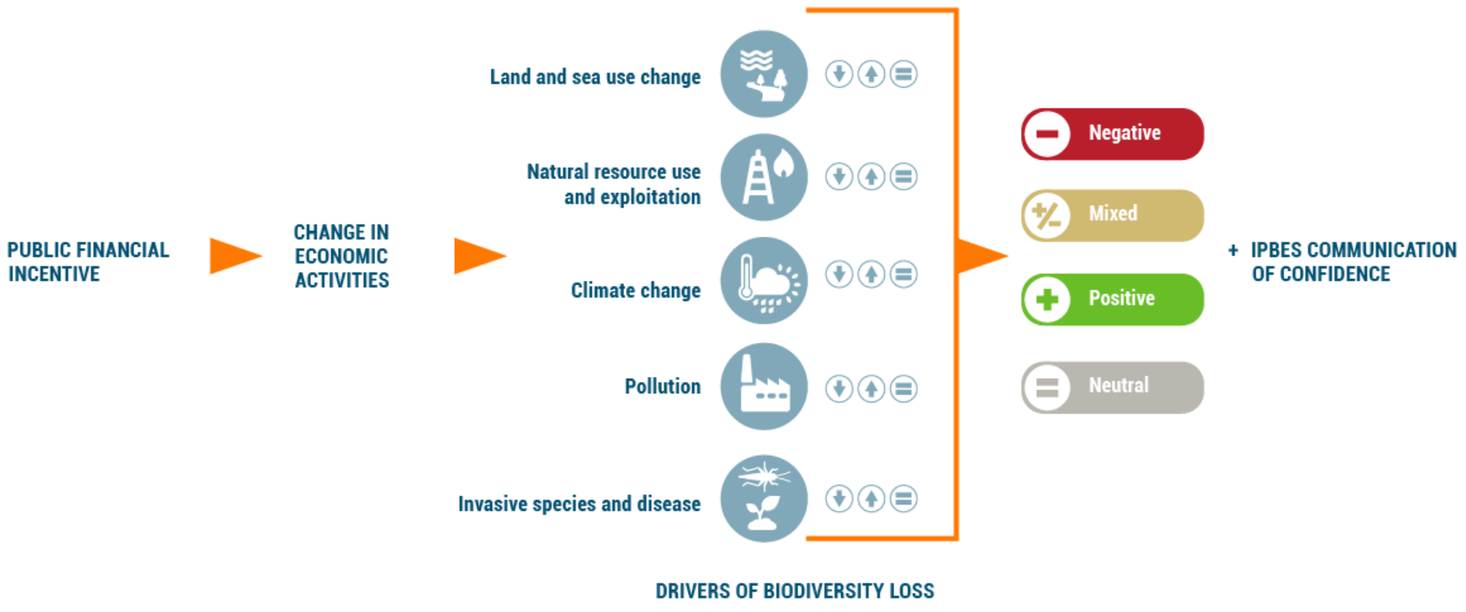
Please fill in which financial incentive the assessment is carried out for:

Assessment item	**Explanation**	**Land/sea use change** Conversion of land cover, changes in the management of the ecosystem or agro-ecosystem or changes in the spatial configuration of the landscape	**Natural resource use and exploitation** Anthropogenic exploitation of wildlife (e.g. marine fish, invertebrates, trees, tropical vertebrates hunted for bushmeat and species harvested for the medicinal and pet trade)	**Climate changes** Changes in climate and weather patterns impacting in situ ecosystem functioning and causing the migration of species and entire ecosystems	**Pollution** Introduction of contaminants (e.g. plastics, chemicals and agricultural runoff) into the natural environment (soil, water, air)	**Invasive species and disease** Invasive species may be indigenous and/or exotic/alien, they disrupt the ecological functioning of natural systems.
Impact of activities on driver	Indicate the impact of the effects of the activity/ activities	☐ Increased ☐ No change ☐ Decreased ☐ Unknown/Unsure	☐ Increased ☐ No change ☐ Decreased ☐ Unknown/Unsure	☐ Increased ☐ No change ☐ Decreased ☐ Unknown/Unsure	☐ Increased ☐ No change ☐ Decreased ☐ Unknown/Unsure	☐ Increased ☐ No change ☐ Decreased ☐ Unknown/Unsure
The direct and indirect effects on driver	List the most important effects	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Substantiation of effects						
Term of effects on biodiversity		☐ Short term (within 5 years) ☐ Long term (after 5 years) ☐ Do not know	☐ Short term (within 5 years) ☐ Long term (after 5 years) ☐ Do not know	☐ Short term (within 5 years) ☐ Long term (after 5 years) ☐ Do not know	☐ Short term (within 5 years) ☐ Long term (after 5 years) ☐ Do not know	☐ Short term (within 5 years) ☐ Long term (after 5 years) ☐ Do not know
Size of effects (estimated area of effect)		☐ Localised ☐ Regional ☐ Global ☐ Do not know Please specify: ……	☐ Localised ☐ Regional ☐ Global ☐ Do not know Please specify: ……	☐ Localised ☐ Regional ☐ Global ☐ Do not know Please specify: ……	☐ Localised ☐ Regional ☐ Global ☐ Do not know If possible indication size: ……	☐ Localised ☐ Regional ☐ Global ☐ Do not know If possible indication size: ……
Impact on ecosystems and/or species rich areas	*Consider soil health and water quality*	☐ No ☐ Yes, on …… ☐ Do not know	☐ No ☐ Yes, on …… ☐ Do not know	☐ No ☐ Yes, on …… ☐ Do not know	☐ No ☐ Yes, on …… ☐ Do not know	☐ No ☐ Yes, on …… ☐ Do not know
Is the damage reversible?		☐ Yes, because …… ☐ No, because …… ☐ Do not know	☐ Yes, because …… ☐ No, because …… ☐ Do not know	☐ Yes, because …… ☐ No, because …… ☐ Do not know	☐ Yes, because …… ☐ No, because …… ☐ Do not know	☐ Yes, because …… ☐ No, because …… ☐ Do not know ☐
Other relevant notes:						

Biodiversity Score Card

Conclusion of effect on biodiversity		
Conclusion	Biodiversity impact score of financial item	☐ Positive ☐ Mixed mostly positive ☐ Mixed ☐ Mixed mostly negative ☐ Negative ☐ Unknown
IPBES assessment guide	Quantity and quality of the evidence?	☐ Low ☐ High What prove? .....
	Level of agreement?	☐ Low ☐ High

Schematic overview of possible outcomes assessment per financial incentive.



Appendix 2 Financial incentive information form

MI. General information	
1.1 Name	***<Enter the name of the financial incentive here>*** *Check the name used by the ministry in the provided overview of financial incentives.*
1.2 Code	***<Enter the code of the financial incentive here>*** *The code used by the organisation conducting the assessment*
1.3 Ministry and responsible department	***<Enter the responsible ministry/department for the financial incentive here>***
1.4 Type of financial incentive	□ Subsidy □ Fiscal incentives □ Risk transfer to the government □ Other, please specify below
1.5 Amount in Euro	***<Enter the amount and reference year of the financial incentive here>*** *Verify the budgeted amount as provided by the ministry. Also, note the reference year for this amount.*
MII Incentive information	
2.1 Problem statement	***<Enter the problem statement of the financial incentive here>*** *Explain the problem that the financial incentive aims to address. Helpful questions include: (1) What is the presumed problem? (2) What are the causes of the problem?*
2.2 Intended objective(s)	***<Enter the intended objectives of the financial incentive here>*** *Describe the objectives intended to be achieved by the financial incentive.*
2.3 Beneficiaries	□ Citizens □ Companies □ Governments □ Civil society *(NGOs, advocacy organisations, etc.)* □ Other, namely…
2.4 Conditions for grant	***<Enter the conditions for the financial incentive here>*** *Describe the 3 to 5 main conditions to be eligible for the financial incentive. Provide a link to where the complete conditions can be found.*
2.5 Expected direct activities	***<Enter the expected direct activities of the financial incentive here>*** *Describe the direct activities resulting from the financial incentive. Direct activities are the consequences of the financial incentive over which the grant recipient has control.*
2.6 Expected indirect activities	***<Enter the expected indirect activities of the financial incentive here>*** *Describe the indirect activities resulting from the direct activities. Indirect activities are consequences over which the grant recipient has no control.*
2.7 Counterfactual	***<Enter the counterfactual for the financial incentive here>*** *Describe the situation without the financial incentive (or with a reduced budget). This may be based partially on assumptions; please indicate these.*
2.8 Existing evaluation(s)	***<Enter the hyperlink to the evaluation of the financial incentive here>*** *Indicate whether the financial incentive has been evaluated. If so, provide the name, date, and link to the evaluation document.*
2.9 Conclusions from existing evaluation(s) relevant to biodiversity	***<Enter the conclusions from existing evaluations relevant to biodiversity drivers here>***
2.10 Adjacent legislation	***<Enter the adjacent legislation related to the financial incentive here>***

Appendix 3 Table for reporting

Title of financial incentive (Dutch)	
Title of financial incentive (English)	
Year of data	
Economic sector(s) of the beneficiaries	
Description including objective	
Responsible authority	
Category of subsidy	
Subsidy volume paid in base year (in EUR)	
Scores drivers	

		Explanation scores drivers
Land-use change	Decrease / Increase / No change / Unknown	
Climate change	Decrease / Increase / No change / Unknown	
Pollution	Decrease / Increase / No change / Unknown	
Natural resources use and exploitation	Decrease / Increase / No change / Unknown	
Invasive species	Decrease / Increase / No change / Unknown	

Biodiversity impact score	POSITIVE / MIXED mostly positive / MIXED / MIXED mostly negative / NEGATIVE / NEUTRAL
Explanation Biodiversity impact score	
IPBES score	Well established / Unresolved / Established but incomplete / Inconclusive

To explore the potential of nature to improve the quality of life

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,700 employees (7,000 fte), 2,500 PhD and EngD candidates, 13,100 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.