ASSESSING PORTFOLIO IMPACTS

TOOLS TO MEASURE BIODIVERSITY AND SDG FOOTPRINTS OF FINANCIAL PORTFOLIOS

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ACRONYMS

ADM	Archer Daniels Midland
BFFI	Biodiversity Footprint for Financial Institutions
BIA	Biodiversity Impact Analytics
bp	Basis point, or 0.01%
CBF	Corporate Biodiversity Footprint
CDC	CDC Biodiversité
CISL	Cambridge Institute for Sustainability Leadership
ESG	Environmental, Social, Governance
EU	European Union
FI	Financial Institution
GBS	Global Biodiversity Score
GHG	Greenhouse gas
GLOBIO	Global Biodiversity Model for Policy Support
IDL	Iceberg Data Lab
MSA	Mean Species Abundance
NEC	Net Environmental Contribution
PDF	Potentially Disappeared Fraction
PIF	Portfolio Impact Footprint
PII	Positive Impact Initiative
PRB	Principles for Responsible Banking
SBTN	Science-Based Targets Network
SDG	Sustainable Development Goal
SFAP	Sustainable Finance Action Plan
SFDR	Sustainable Finance Disclosures Regulation
SIFN	Sustainable Investment Framework Navigator
TNFD	Task Force on Nature Related Financial Disclosures
UN	United Nations
UNEP	United Nations Environment Program
UNEP FI	United Nations Environment Program Finance Initiative
WWF	World Wide Fund for Nature

FOREWORD

Over the last decade, financial sector understanding of climate- and nature-related environmental and social risks has grown tremendously. And, thanks to the growing body of research demonstrating how such risks can affect financial portfolios, financial institutions are developing more rigorous approaches to evaluating companies' ESG performance.

More recently, assessing the environmental and social impacts of portfolios has become increasingly material, with more and more investors keen to identify investment opportunities that will benefit people and planet and avoid those that will cause harm.

This requires accurately measuring sustainability impacts. Although no simple task, robust tools and methodologies can help quantify portfolio environmental, social and governance impacts, and generate information suitable for investment decision-making.

As better quality data becomes available, and disclosure of sustainability risks, targets, strategy and governance is integrated into mainstream reporting, including through initiatives like the nascent Taskforce on Nature-related Financial Disclosures, ESG investing must widen the aperture on risks to embrace and address impacts.

That is why, in this report, we have explored tools with a focus on impacts related to biodiversity as well as the UN Sustainable Development Goals. Using a sample portfolio, we look at how they perform, and also suggest how tool providers, financial institutions, and regulators can develop and apply impact measurement approaches, particularly with respect to nature.

Together, we want to facilitate collaboration, advance impact measurement at technical and policy levels, and shift financial flows toward nature-positive activities. We look forward to accompanying you on the journey.

Margaret Kuhlow

Global Finance Practice Leader, WWF International

Finance must help shape a nature-positive global economy that restores ecosystems, stabilises the climate, and supports social inclusion, health and well-being. At Mirova, we are supporting the transition to a more sustainable economy by examining both positive and negative impacts of potential investments, and accounting for these in all our decisions, across capital allocation, investment, research, and shareholder engagement. And we provide our clients with innovative products and solutions which help them understand the impacts of their investments, including on nature and achievement of the UN Sustainable Development Goals.

We welcome this new and thorough analysis of emerging impact assessment tools by WWF as well as its call for financial institutions to participate in the development and refinement of the tools. Though still at an early stage, these tools can complement existing ESG ratings and risk metrics by providing an important data point on the environmental impacts resulting from investment and lending activities. What may now seem like an optional nice-to-have will increasingly become a fundamental must-have for the whole investment community as the availability of decision-grade data improves and as the financial sector incorporates science-based methodologies to measure their impacts.

Mirova is proud to be one of the leading financial institutions contributing to the development of knowledge for impact-oriented tools, services and databases. We encourage others to collaborate with us and WWF so that we can shape and develop this important work together.

Philippe Zaouati

CEO, Mirova

EXECUTIVE SUMMARY

- Investors in listed assets (equities, bonds, etc.) are familiar with ESG risks, and are now beginning to consider the environmental and social impacts of their portfolios, thanks to increasing focus on these issues from both policymakers and the private sector.

- Using a number of new tools, investors can assess entire portfolios across a variety of impacts, on an absolute basis or relative to a benchmark. These tools range from those which address environmental impacts in general, to those which focus on specifics such as biodiversity, as well as on metrics for delivery on the UN Sustainable Development Goals.

- These tools can be applied to deliver various insights, including comparing a portfolio's impact footprint with a benchmark, another portfolio, or even itself over time; cross-checking claims of sustainability made by an investment fund, to meet potential certification or disclosure requirements; and identifying leaders and laggards in impact performance within a portfolio, to facilitate portfolio rebalancing or to prioritize corporate engagement.

BEYOND ESG REPORTING, BEYOND CLIMATE, AND BEYOND RISK ASSESSMENT

The term ESG is no longer a new concept to the investor community, although its application still varies, with focuses ranging from materiality assessment, transparent disclosure, and exclusion to portfolio construction and rebalancing strategy. Portfolio investors have access to numerous tools that provide ratings or risk assessments along various environmental factors for their investments within the context of the ESG framework. There are also a number of tools that help assess the alignment of financial portfolios to climate goals, such as the Paris Agreement Capital Transition Assessment (PACTA).

One topic that has received less mainstream attention is that of the impacts financial institutions can have on the environment (including biodiversity), people and society. This is starting to change, thanks to several emerging trends:

- From a regulatory perspective, there is increasing momentum towards requiring investors to disclose their alignment with and their negative material effects on sustainability factors that are caused by or related to their investments.

- The concept of double materiality – companies and financial institutions (FIs) should not only consider the financially material impacts on them from environmental risk, but should also understand the impacts of their activities on the environment – has led to increasing interest in measuring impacts beyond assessing risks, which has been the predominant area of focus in sustainable finance to date.

- Protecting nature and biodiversity has been a topic of growing importance to the private sector – biodiversity loss emerged as a top 5 global risk in the annual World Economic Forum (WEF) Global Risks Report in 2020 and sustained that status in 2021. The Natural Capital Protocol has also played a significant role in setting out an internationally accepted framework for business and financial institutions to measure and value their natural capital impacts and dependencies.

Underpinning these trends is the 2015 establishment of the Sustainable Development Goals (SDGs) by the United Nations, which added an explicit impact orientation to the sustainable investing domain. Now the finance sector is increasingly asking: to what extent is ESG investing (or the related category of sustainable/responsible investing) truly helping to achieve environmental and societal goals – broadly, the SDGs?

This question is driving increased interest from FIs in measuring and assessing the impacts that result from

their investment and portfolio management decisions, particularly with respect to the SDGs, the environment in general, and biodiversity in particular. In order to enable such assessment, a few new tools have emerged that calculate the SDG footprint of companies in an investment portfolio, or provide an analysis of the SDG-aligned revenues of constituent companies in financial portfolios or indices. Following the path of the climate impact/alignment tools, a number of biodiversity impact measuring tools are also being developed to provide assessments at the investment portfolio level.

DEEP DIVE INTO SDG/BIODIVERSITY FOOTPRINT TOOLS

To measure impact, tool developers targeting portfolio investors have generally adopted the "footprint" approach. Using a variety of data sources which include corporate disclosures, estimated data and third-party databases, typically combined with internal modelling based on these inputs, the tools calculate the relevant outputs for the chosen ESG/SDG/biodiversity variables involved. These tools range from the specific (e.g., biodiversity-focused) to the holistic (e.g., SDG-focused); these endpoints are the two types of tools focused on in this report.

Since the holistic tools covered in this report focus on measuring impacts along metrics aligned with the SDGs, their results include not only environmental factors but also social and governance factors. Outputs tend to be wide-ranging, involving everything from metric tonnes of waste

to number of employees, and the portfolios are generally assessed relative to a mainstream reference benchmark such as the MSCI World Index. The concepts these tools engage with are already broadly familiar to mainstream investors, and the data sources they use are mostly linked to well-established parts of regulatory disclosure frameworks for financial and ESG information. As a result, they have the potential to benefit from rapid adoption by mainstream investors even after factoring in issues regarding data quality and availability with respect to ESG disclosures.

Biodiversity footprint/impact measurement tools combine publicly disclosed corporate information, raw or processed data from open-source scientific databases, and proprietary modelling to capture the biodiversity impact of a company inclusive of its upstream and downstream effects in a scientifically rigorous way. This typically involves some form of value chain analysis that is cross-linked to the company's production locations and the various biodiversity pressures involved. The metrics provided are absolute measurements (e.g. Mean Species Abundance or Potentially Disappeared Fraction) rather than relative to a benchmark, and are calculated on a company-by-company basis; portfolio-focused versions of these tools typically involve the aggregation of numerous company-level assessments.

This report identified 7 tools & services that provide impact measurement/footprinting outputs that are relevant for portfolio investors and other FIs. A further 11 tools, methodologies & frameworks, databases, and other services were included in an "honourable mention" category. The primary list of tools is shown in the figure below. It includes 3 biodiversity-specific tools (2 for investment portfolios and

1 for bank assets), 3 holistic tools (2 for investment portfolios and 1 for bank assets), and one general "E" company assessment tool that has enough coverage to be useful for portfolio-level assessments.

The case studies conducted on 4 of the tools on this list provide a practical demonstration of their outputs, as well as insight into their strengths and limitations in providing decision-useful information to investors and portfolio managers. Two biodiversity-specific tools and two holistic tools focusing on SDG-related themes were chosen to run a sample 10-name portfolio focused on the agri-food sector.

• For the biodiversity-specific tools, the assessments showed that the footprint was very concentrated, with 50%-80% of the portfolios' impact caused by the three companies with the highest impact in each portfolio.

• The SDG-oriented tools both indicated that the sample portfolio performed poorly compared to the benchmark (the MSCI World Index) on environmental metrics, and somewhat better than the benchmark for the non-environmental metrics.

The results of the case studies clearly demonstrate that the tools can be used by investors to inform their portfolio construction and rebalancing processes. They provide investors with visibility into the footprints of their portfolios (e.g., water usage per US$ million invested) and help them identify those companies that can be prioritized for active time-bound engagement or, if this proves ineffective, exclusion. As the outputs of these tools can be used to disclose environmental or biodiversity-related footprints, they can complement existing sustainability reporting. Using such impact information, investors can cross-check sustainability claims made by investment funds (including those not labelled with a sustainable theme), and fund managers can use the results to report the impact data associated with their funds. As the policy environment evolves, such impact disclosure may also help funds meet regulatory or certification requirements.

As all of these tools are relatively new, there is as yet no standardisation of how their results are presented. While there are some efforts such as the European Commission's Align project to build common practices, for now it is up to users to choose the best methodology and tool to suit their needs by understanding how these tools work and showcasing their results.

OUTLOOK AND RECOMMENDATIONS

It is early days for impact assessment/footprinting. The tools explored in this report will only grow in depth, breadth, and maturity as companies and FIs discover and make use of them, and as company reporting becomes standardised and more comprehensive. Policy action can not only encourage and accelerate their adoption and further development but

also foster a disclosure regime or sustainability accounting framework that provides the data required to improve the accuracy and granularity of the tools.

In particular, this report suggests:

• **Tool developers** to consider ways to harmonise the metrics and language they use to measure and present their outputs and to support expanded corporate data disclosure including impact assessment

• **Financial institutions** to use these types of tools to understand where impacts and risks lie as they consider how to incorporate impact into their sustainability journey and investment decision-making process

• **Regulators and policymakers** to ensure that impact measurement is included as part of the continued integration of sustainability factors into policy and regulatory frameworks

WWF will also play a role by:

• Raising awareness of environmental impact measurement beyond climate environmental impact at the portfolio level

• Supporting research efforts focusing on biodiversity impact metrics, data, and impact measurement of mainstream indices

• Engaging with regulators and policy-makers to advise on the applications of these tools in implementing regulations related to sustainable finance disclosure and impact measurement.

Although the footprinting tools are backward-looking and only capture a snapshot of the current impacts, they still provide the first useful piece of information to identify where critical companies and sectors lie in a portfolio, and to develop targeted strategies to address them. Moreover, the results and analyses from the biodiversity-specific tools can have important implications for the implementation of the Taskforce on Nature-related Financial Disclosure (TNFD) and the Science-Based Targets Network (SBTN). They can enable appropriate impact disclosure for reporting according to the TNFD's recommendations and serve as the baseline information for target-setting, which will lay the foundation for more forward-looking analysis in the future.

Figure 1: WWF Impact Tool Resource Database – Primary List

Name	Provider	Assessment Focus	Assessment Target	Impact Measurement Type	Ease of Use
Corporate Biodiversity Footprint	Iceberg Data Lab	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated
Biodiversity Impact Analytics	CDC Biodiversité / Carbon4 Finance	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated
Biodiversity Footprint for Financial Institutions	ASN Bank / PRé / CREM	Biodiversity-specific	Bank Balance Sheet	Absolute	Partially automated
Net Environmental Contribution metric	Sycomore AM et al.	General E focus	Companies / Portfolio	Relative	Partially automated
Portfolio Impact Footprint	Impact Cubed	SDG	Investment Portfolio	Relative	Fully automated
Sustainable Investment Framework Navigator	KPMG / CISL	SDG	Investment Portfolio	Relative	Fully automated
Portfolio Impact Analysis Tool for Banks	UNEP FI Positive Impact Initiative	SDG	Bank Business Lines	Relative	Partially automated

Source: WWF

INTRODUCTION

1.1 BACKGROUND

The UN PRI defines "ESG integration" as "the systematic and explicit inclusion of material ESG factors into investment analysis and investment decisions." ESG integration can be undertaken at a firm level as well as within specific funds, mandates or strategies.

ESG data is improving and its usage is increasingly mainstream. A wide variety of providers have developed tools and methodologies to support the integration of ESG factors into the business and investment processes of financial institutions (FIs). However, these factors are largely used in the context of risk assessment or management – finance sector ESG integration has not yet demonstrated a significant focus on the impacts that those institutions can have on the environment, people, and communities.

This is starting to change, thanks to several emerging trends. First, from a regulatory perspective, the EU's Sustainable Finance Action Plan (SFAP) and its major components such as the EU Taxonomy and the Sustainable Finance Disclosure Regulation (SFDR) incorporate requirements for investors to disclose their alignment with the Taxonomy and the negative material effects on sustainability factors that are caused by or related to their investments (Simmons+Simmons 2020).

Second, the concept of double materiality – companies and financial institutions (FIs) should not only consider the financially material impacts on them from environmental risk but should also understand the impacts of their activities on the environment – is gaining in acceptance following its introduction in the European Commission's 2019 Guidelines on Non-Financial Reporting. This has led to increasing interest in measuring impacts beyond assessing risks, which has been the predominant area of focus in sustainable finance to date.

Finally, protecting nature (the phenomena of the natural world) and biodiversity (the diversity of life within the natural world) has been a topic of growing importance to the private sector. The World Economic Forum's 2020 Global Risks Report for the first time identified biodiversity loss as a top-5 risk in terms of both likelihood and impact over the following five years (WEF 2021). This followed the warning from the Intergovernmental Science-Policy Panel on Biodiversity and Ecosystem Services in 2019 that nature loss is accelerating at an unprecedented rate, with grave impacts for human wellbeing, and that a million species face extinction (IPBES 2019). The development and application of the Natural Capital Protocol, an internationally accepted framework for business and FIs to measure and value their

natural capital impacts and dependencies, has also had a significant impact in elevating the importance of protecting nature to the private sector.

Underpinning these trends is the 2015 establishment of the Sustainable Development Goals (SDGs) by the United Nations, which added an explicit impact orientation to the sustainable investing domain. Previously, sustainable investment processes that integrated ESG factors essentially asked whether the companies under question produced goods and services in a responsible way, without necessarily examining the environmental and/or societal impacts of these goods and services.

Integrating these trends has led the financial sector increasingly to ask a different question: to what extent is ESG investing (or the related category of sustainable/responsible investing) truly helping to achieve environmental and societal goals – broadly, the SDGs? This question is driving increased interest from FIs in measuring and assessing the impacts that result from their investment and portfolio management decisions, particularly with respect to the SDGs, the environment in general, and biodiversity in particular.

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In the SDG space, some options have started to emerge recently, such as the UNEP FI's Positive Impact Initiative (currently bank-focused but with investment activities under development), and there are a number of new tools that calculate the SDG footprint of companies in an investment portfolio, or provide an analysis of the SDG-aligned revenues of constituent companies in financial portfolios or indices. These and other tools under development may be used to better understand the impact or contribution a company or investment portfolio makes with respect to achieving one or more SDGs. While these tools are holistic in nature, with only a partial focus on the environment, they do at least provide some coverage of the issue

Measuring biodiversity impact is more challenging than measuring climate impact especially at the investment portfolio level, as the multiplicity of variables involved (vs. just CO2-equivalent for climate) makes it difficult to reduce the measurement to a single number. In addition, data availability for each of the variables ranges from good to non-existent, and disclosure mandates are highly limited in most cases. Nature-related impacts are also much more location-dependent than climate, which compounds the difficulty in measuring impact, even within a single organisation.

1.2 REPORT SCOPE

This report provides an overview of the types of tools currently available that can assist portfolio investors in their efforts to measure at least some portion of the environmental impact of their investment portfolios. This report has a particular focus on tools that enable impact measurement of listed asset portfolios, as this segment of the market appears underserved at present.

The tools identified range from the specialist (single issue) to the holistic (multiple issues with limited interdependencies). Impact measurement tools specific to climate are excluded, due the comparatively advanced state of climate tool development and related disclosure infrastructure, although climate issues in the form of greenhouse gas (GHG) emissions are incorporated into both the specialist and holistic tools.

For the specialist tools, this report focuses on biodiversity, given 1) the accelerating deterioration of the natural world from anthropogenic impacts; and 2) the domain's alignment with WWF's mission. These biodiversity-focused tools calculate the environmental pressures exerted by a portfolio's constituents in terms of the pollutants they emit and their use of land, including upstream and downstream pressures where possible.

That said, there are a few tools on the market that provide this kind of information, including a tool that measures companies' biodiversity footprint that recently gained the support of a consortium of asset managers[1] focused on the issue of biodiversity and investments.

This recent emergence of tools and frameworks concerned with measuring portfolio-level impact is welcome, and bears examining. This report aims to provide an understanding of a selection of impact measurement tools, with a focus on two types: SDG-related tools and biodiversity-related tools. It looks at their assessment targets, outputs, methodologies, strengths, and limitations to facilitate FIs in using them to integrate impact considerations into their investment and reporting processes.

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[1] AXA Investment Managers, BNP Paribas Asset Management, Sycomore Asset Management and Mirova.

The holistic tools typically aim to determine the SDG or ESG footprint of an investment portfolio. As such, the environmental issues they examine typically include some indicators of absolute physical impact such as greenhouse gases (GHGs) emitted or fresh water consumed, usually on a per amount invested basis.

This report will not focus on:

● Rating tools

● Risk assessment tools

● Disclosure/reporting/accounting tools

● Scenario analysis tools

This report does not seek to recommend a particular impact measurement tool – within each category, the tools are all designed for slightly different purposes to meet the different needs of their target users. In addition, WWF recognizes that different portfolio investors are at different stages in their journey to integrate E factors into their investing processes and priorities.

IMPACT ASSESSMENT TOOLS FOR PORTFOLIO INVESTORS

All economic activity ultimately has an impact on the natural world, and the natural world is a vital resource that supports this economic activity. The sustainable use of the world's natural capital is critical to securing the future for nature and people. Because the financial sector's impacts on the real world are generally filtered through the actions of companies, determining FI impacts has historically been challenging, especially for portfolios focused on listed assets.

As defined by the Impact Management Project, which provides a forum for building global consensus on how to measure, manage, and report impacts on sustainability, impact is "a change in an outcome caused by an organisation. An impact can be positive or negative, intended or unintended." (IMP 2021)

Measuring environmental impacts for specific projects is relatively straightforward, using well-established frameworks such as the Equator Principles or the International Finance Corporation's Environmental & Social Performance Standards. It is more difficult to do so for a financial portfolio, especially one that is large and well-diversified. Depending on the portfolio's composition, data quality and availability for a given dimension of impact may vary considerably, and each

constituent of the portfolio will have a unique impact profile. For listed asset portfolios in particular, data availability may be restricted to regulatory disclosures, as compared to the kind of information that a bank might require to extend a loan.

For biodiversity, this issue is compounded by the many variables involved, each with its own characteristic response to environmental pressure. In particular, similar pressures in different locations can yield different responses, depending on the local environment. This increases the complexity of modelling biodiversity impacts of multi-location entities, particularly as compared to modelling the impact of greenhouse gas emissions, which can be treated as acting globally rather than locally.

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2.1 FOOTPRINTING

In response to this problem, tool developers targeting portfolio investors have generally adopted the "footprint" approach. Using a variety of data sources which include corporate disclosures, estimated data and third-party databases, typically combined with internal modelling based on these inputs, the tools calculate the relevant impacts for the chosen ESG/SDG/biodiversity variables involved. These tools can be classified as holistic or issue-specific.

For holistic footprinting tools such as those looking at ESG or SDG factors, these outputs tend to be wide-ranging, involving everything from metric tonnes of waste (SDG 12: resource security) to number of employees (SDG 8: decent work and economic growth). These metrics are aggregated by company to the portfolio level and are compared to a reference benchmark, typically the same one used to determine the portfolio's relative financial performance such as the MSCI World Index. Depending on the tool, many different readouts may be possible, such as the percentile performance relative to benchmark of individual portfolio constituents or the total portfolio along each metric, or an indication of resource-use intensity like waste generated per US$m of revenue.

Biodiversity footprinting tools for corporates are more narrowly focused but examine the issue as deeply as possible, attempting to capture the biodiversity impact of a company inclusive of its upstream and downstream effects in a scientifically rigorous way. This typically involves some form of product life cycle and/or value chain analysis that is cross-linked to the physical locations involved in the company's activities and the various biodiversity pressures involved. To ease comprehension for non-specialists (i.e., the target user), the results are translated into a single metric reflecting species availability. For the tools currently available, this metric is either Mean Species Abundance (MSA in km2) or the Potentially Disappeared Fraction (PDF) of species per area per year (see Box 1 for more detail on MSA and PDF).

It is important to note that footprinting tools in general only capture a snapshot in time and can thus be challenging to use them to support forward-looking risk or impact monitoring approaches. That said, until disclosure regimes and scientifically validated modelling techniques reach the point where forward-looking tools are possible for biodiversity, the information provided by footprinting tools can still be put to good use. In particular, the tools can provide investors with visibility into the footprints of their portfolios (e.g., water usage per US$ million invested) and present opportunities to reduce or mitigate negative impact.

At the portfolio level, one way impact may be defined is in terms of changes in footprint over time, especially on a like-for-like basis. Changes in a portfolio's ESG/SDG/biodiversity footprint can reflect:

1) underlying changes in constituent footprints (without changing the portfolio composition),

2) shifts in portfolio composition (from changes in constituents or sector weightings), or

3) changes in a benchmark's footprint stemming from 1) or 2), for those tools that measure performance in relative terms.

Depending on the sector, investors may be able to achieve significant short-term footprint reductions in their portfolios just by taking action on 2), i.e., by switching companies within a given industry sector, similar to carbon. More fundamentally, investors should also take action on 1) by engaging with investee companies to spur them to act to avoid, reduce, and/or mitigate their impacts – this is a longer-term approach.

It should also be noted that in the situation where a portfolio has not changed its constituents but the underlying companies have changed their performance significantly over time – 2-3 years, for example – it is not yet clear to what extent current tools would show a materially different impact footprint.

Key sources of this uncertainty are update timing and model granularity. For timing, some elements of footprint tools may utilise datasets where the most recent data available is several years in the past (a common situation for data from UN agencies, for example) or that are updated only every several years. Although tool developers may be able to adjust for this via internal modelling, this may not capture effects from significant data outliers until the actual dataset is updated. For granularity, tools utilising sector- and/or country-level averages as part of their calculations may have difficulty reflecting meaningful changes that occur at a smaller scale – this is more of an issue for biodiversity footprinting tools.

2.2 TOOLS & METHODOLOGIES

2.2.1 BIODIVERSITY IMPACT MEASUREMENT APPROACHES

Biodiversity footprint/impact measurement tools combine publicly disclosed corporate information, raw or processed data from open-source scientific databases, and proprietary modelling to generate their output, which is expressed in terms of metrics combining area and species loss, such as MSA or PDF in a given area (typically km^2). The metrics provided are absolute measurements rather than relative to a benchmark.

The corporate information can include environmental impact data, but in its absence standard financial disclosures provide a starting point for measuring a corporate footprint. Put briefly, this is done by translating revenue figures into production volume, which is then combined with several open-source scientific databases and methodologies (e.g., EXIOBASE, ReCiPe/Life-Cycle Assessment) that translate this production volume and associated resource usage into a number of different environmental pressures, such as land use change, greenhouse gas emissions, freshwater pollution, and nitrogen oxide emissions. These pressures are

then converted into biodiversity impacts using the chosen metric – MSA in this procedural example – via open-source models like the Global Biodiversity Model for Policy Support (GLOBIO). See Figure 5 for a representation of this process.

These assessments incorporate standardized elements from scientific datasets that provide baseline figures reflecting geography, industry, and/or sector, but must also be tailored on a company-by-company basis to ensure relevance and scientific rigor. Ultimately for corporate footprints to be of use at the portfolio level they must be performed for substantially all of the constituents of major indices, which takes time and explains their relatively high cost as compared with holistic tools – typically in the tens of thousands of euros per year.

Box 1: MSA and PDF

Mean Species Abundance (MSA) definition: MSA is an indicator of naturalness or biodiversity intactness. It is defined as the mean abundance of original species relative to their abundance in undisturbed ecosystems. An area with an MSA of 100% means a biodiversity that is similar to the pristine state. An MSA of 0% means all original species are locally extinct. (GLOBIO 2021)

Potentially Disappeared Fraction (PDF) definition: The PDF is the rate of species loss (or in ecological terms the extinction rate) in a particular area of land or volume of water during a particular time due to unfavourable conditions associated with environmental pressures such as land conversion, land occupation, toxicity, increase in average global temperature, or eutrophication. (Slay 2011)

Discussion: While MSA vs PDF have technical differences, from the point of view of the user of the tool they articulate the same thing – the estimated level of degradation of biodiversity in a given area compared to a hypothetical "pristine state" reference level. The biggest difference to be aware of from a user perspective is that for MSA a lower number indicates a worse result, whereas for PDF the opposite holds true.

2.2.2 SDG/ESG HOLISTIC APPROACHES

Holistic impact footprinting/measurement tools take a broader and shallower approach than specialist tools. The tools examined in this report are generally focused on metrics aligned with the Sustainable Development Goals or the ESG framework, and thus include coverage of non-environmental factors – typically some combination of Social and Governance factors.

The tools utilise indicators that focus on outcomes and that are widely reported in the context of ESG and/or financial disclosure requirements, such as revenue from the provision of goods and services that supply basic needs, the proportion of women at board/top management level or tons of waste produced per unit revenue. Environmental metrics thus tend to focus on greenhouse gas emissions, water usage and waste produced. Portfolio performance is measured relative to a chosen benchmark, and the tools in some cases also provide some indication of resource use efficiency (e.g., cubic litres of fresh water used per $m invested, or some other reasonably relevant metric).

This focus on widely disclosed metrics – in formats that support automation – allows these holistic tools to provide coverage of a significant proportion of global listed companies in investable markets – typically 10,000+ companies. This

also helps keep costs lower than the specialist tools for low volume users, with prices in the single thousands of euros per portfolio assessed. The combination of breadth of companies covered, relatively low cost, and focus on the increasingly mainstream and marketable SDG/ESG themes suggests that the holistic tools are better positioned than the biodiversity-focused tools to gain widespread usage in the near term.

Developers of holistic tools are cognizant of the limitations of current disclosure regimes and expect to improve their tools as better data are disclosed. Biodiversity-related metrics are high on the list for inclusion in many holistic footprinting tools, but data availability remains the key barrier.

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2.3 TOOL DATABASE AND CHARACTERISTICS

This report identifies 7 tools & services that provide impact measurement/footprinting outputs relevant for portfolio investors and other FIs. A further 11 tools, methodologies & frameworks, databases, and other services were included in an "honourable mention" category. The main assessment & classification criteria for the tools are shown in the figures below, following an initial screen that favoured tools which make publicly available significant details about their methodologies.

Figure 2: Selected Impact-Oriented Tools by Type – Primary List & Honourable Mention

Source: WWF

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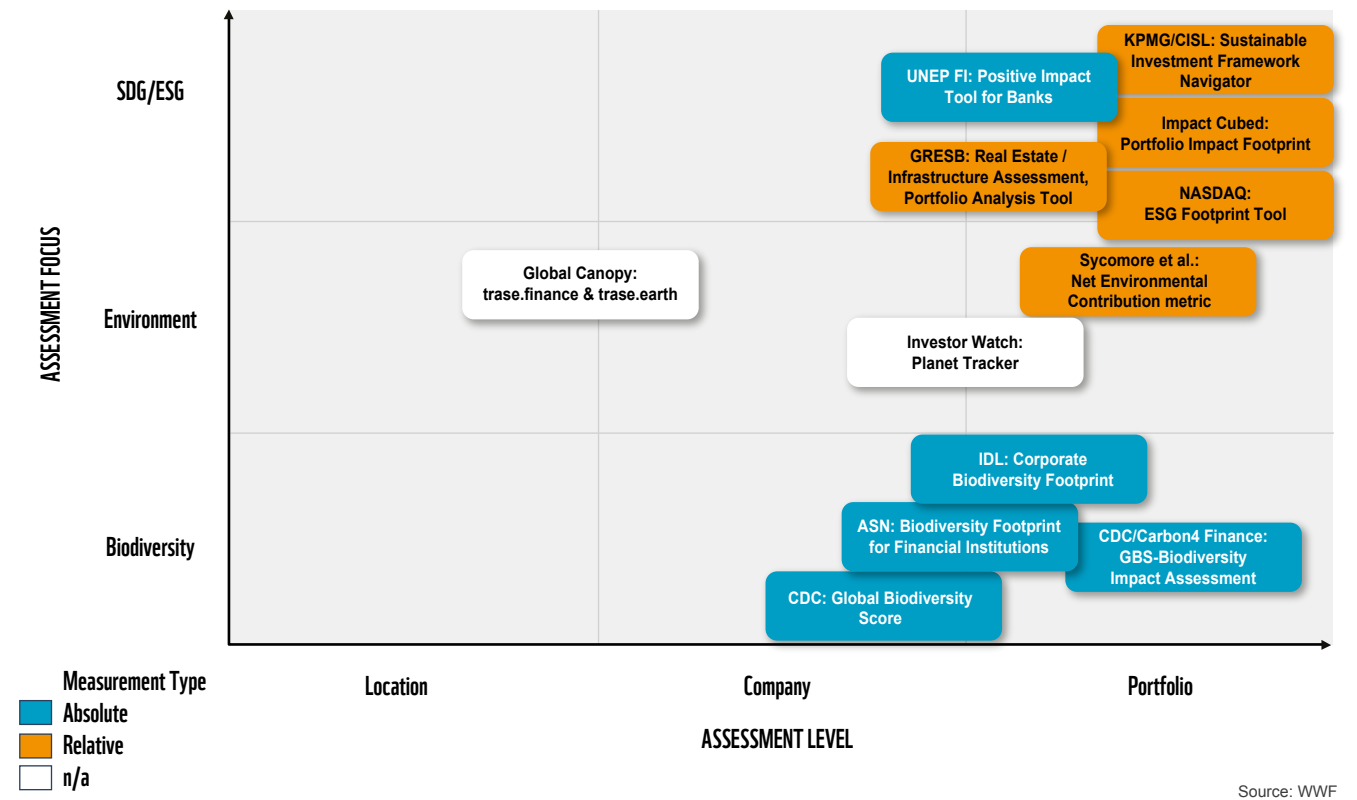
Figure 3: WWF Impact Measurement/Footprinting Tool Assessment & Classification Criteria

Criteria	Variables	WWF Preference	Comments
Tool assessment focus	Holistic (SDG/ESG) General E focus Biodiversity-specific Other E-specific (climate/water/etc)	Biodiversity-specific	For holistic tools, WWF prefers SDG over ESG due to SDG in-built bias for impact vs ESG's more neutral/descriptive nature
Tool assessment target	Listed asset portfolio Loan portfolio Companies Discrete project Other	Listed asset portfolios	Either in real-time or via an aggregation of multiple pre-existing company assessments
Impact measurement type	Absolute (e.g., MSA.km² or million L water used) Relative (vs benchmark) Both Other	Absolute	Although preference is for absolute measures of impact, there are very few tools available that are able to provide this
Ease of use	Fully automated Partially automated Manual process	Fully automated	Viewed as key for mainstream adoption
Geographical coverage	Global Regional National Provincial Local	Global	Some tools examined are explicitly narrow in geo. coverage, while others are still building out coverage
Sector coverage	Pan-sectoral Limited sectors Specific sector	Pan-sectoral	Some tools examined are explicitly narrow in sector coverage, while others are still building out coverage

Source: WWF

The primary list of tools is shown in the figure below. It includes 3 biodiversity-specific tools (2 for investment portfolios and 1 for bank assets), 3 holistic tools (2 for investment portfolios and 1 for bank assets), and one general "E" company assessment tool that has enough volume to be useful for portfolio-level assessments. All of these tools provide global and pan-sectoral coverage.

The full list of tools and honourable mentions are included in Annex A: WWF Impact Tool Resource Database. The honourable mention category encompasses items that are related to impact but which did not meet one or more of the preferences articulated above. It also includes some items that are not actually tools but which offer useful impact-related content, such as the GIIN's Impact Toolkit database.

Figure 4: WWF Impact Tool Resource Database – Primary List

Name	Provider	Assessment Focus	Assessment Target	Impact Measurement Type	Ease of Use
Corporate Biodiversity Footprint	Iceberg Data Lab	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated
Biodiversity Impact Analytics	CDC Biodiversité / Carbon4 Finance	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated
Biodiversity Footprint for Financial Institutions	ASN Bank / PRé / CREM	Biodiversity-specific	Bank Balance Sheet	Absolute	Partially automated
Net Environmental Contribution metric	Sycomore AM et al.	General E focus	Companies / Portfolio	Relative	Partially automated
Portfolio Impact Footprint	Impact Cubed	SDG	Investment Portfolio	Relative	Fully automated
Sustainable Investment Framework Navigator	KPMG / CISL	SDG	Investment Portfolio	Relative	Fully automated
Portfolio Impact Analysis Tool for Banks	UNEP FI Positive Impact Initiative	SDG	Bank Business Lines	Relative	Partially automated

Source: WWF

2.4 TOOL DESCRIPTIONS

2.4.1 CORPORATE BIODIVERSITY FOOTPRINT – ICEBERG DATA LAB (IDL)

The Corporate Biodiversity Footprint (CBF) measures the impact of corporates on Biodiversity. It is designed to serve the needs of FIs to have a science-based and scalable approach capable of covering large portfolios with a bottom-up approach covering the most material impacts of constituents throughout their value chain. (Lammerant, et al. 2021)

For a given company the CBF uses publicly disclosed financial and operational data to estimate its specific environmental pressures, encompassing:

• Land use

• Air pollution: release of nitrogen

• Climate change: GHG emissions

• Water pollution: release of toxic compounds in freshwater ecosystems

These pressures are calculated for direct activities (Scope 1) as well as for the company's electricity suppliers and its upstream and downstream impacts, to the extent possible, following the approach outlined in section 2.2.1 above. These pressures are then expressed in terms of MSA.km2 individually and in aggregate. Recognising data availability limitations, the CBF also includes an indicator of data quality for each data point.

IDL partnered with environmental consultant I Care & Consult to win a competitive tender issued in early 2020 by a consortium of 4 asset managers (see footnote 1 above) seeking to develop a tool that allows investors to measure how their investments impact biodiversity. This partnership brought the tool access to the Net Environmental Contribution metric (see section 2.4.4 below), which is now incorporated into the tool's company-level profiles. The asset managers are supporting the continued development and expansion of the CBF, including integration of portfolio analytics and the inclusion of positive impacts in the tool's assessments.

CBF currently covers issuers operating in several sectors with the highest impact on biodiversity (Agri-Food, Oil & Gas, Metals & Mining, etc.), and by the end of 2021 will cover all high- and medium-impact sectors within the MSCI AWCI Index, MSCI's flagship global equity index with over 2,900 constituents. Full coverage of the index is targeted for the first half of 2022. Beyond equities, the tool can also be used to assess bonds (including sovereign and green bonds), corporate loans, private equity, real assets, commodities, and project finance.

Figure 5: Iceberg Data Lab's Corporate Biodiversity Footprint Methodology
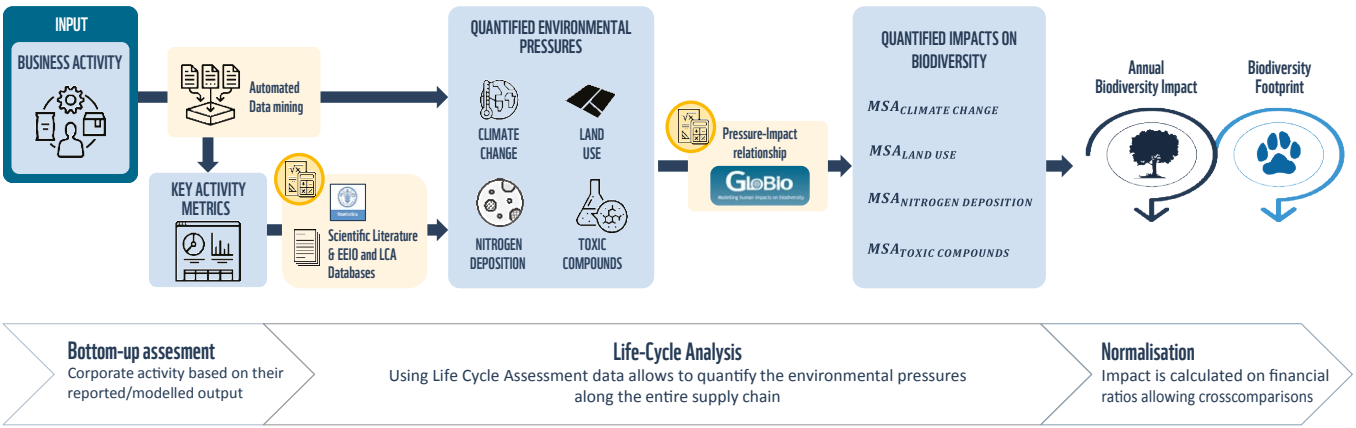
Source: Iceberg Data Lab

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2.4.2 BIODIVERSITY IMPACT ANALYTICS – CDC BIODIVERSITÉ & CARBON4 FINANCE

Biodiversity Impact Analytics powered by GBS (BIA-GBS®) is an integrated impact database that provides an overall and integrated vision of the biodiversity footprint at the issuer and portfolio level, considering the full value chains of the underlying companies. It is essentially a portfolio-focused application of CDC Biodiversité's Global Biodiversity Score® (GBS®) tool, and was developed in partnership with Carbon4 Finance, incorporating Carbon4's financial and climate data as well as its portfolio analytics functionality. 6,000 assets are covered as of April 2021 (European listed equities, corporate and sovereign bonds) and 10,000 assets will be covered by July 2021 including major indices such as the MSCI World Index and the S&P 500.

GBS® is a biodiversity footprint assessment methodology, which can be used to evaluate the impact or footprint of companies and investments on biodiversity. Its outputs are expressed in terms of MSA.km2 and are based on PBL Netherlands Environmental Assessment Agency's GLOBIO model which accounts for five terrestrial pressures and 5 aquatic (freshwater) pressures (Lammerant, et al. 2021). These pressures are calculated following the approach outlined in section 2.2.1 above. Results are further split into dynamic (occurring within the period assessed, typically one year) and static (persistent) impacts. Footprint results can be combined into one single figure expressed in MSA.ppb*[2].

BIA-GBS®'s primary target users are FIs, particularly institutional investors. It aims to help users to understand the biodiversity impacts of their listed investments, where they come from (sector, company, pressure, scope, location), how they perform relative to benchmarks and if they are aligned with international targets, in order to report their biodiversity impact or to integrate it into their investment decision process.

Biodiversity impacts for underlying assets are computed based on Carbon4 Finance's financial and carbon data (available at the company level), combined with GBS®'s impact factors. BIA-GBS® leverages Carbon4 Finance's existing physical risk database to evaluate monetary data (geographical and sectoral breakdown of the company's activity) and carbon emissions data (GHG emissions for Scope 1, 2 and 3 reported or modelled based on a bottom-up approach). The 2021 version of BIA-GBS® will thus evaluate climate change pressure impacts based on carbon emissions, while all other pressures are estimated

based on monetary data using a combination of EXIOBASE model and CDC Biodiversité's commodity impact factors. In 2022, the partners plan to release an upgraded tool with bottom-up evaluations for high-stakes sectors integrating spatial elements, physical flows, and pressure data at the corporate level.

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[2]MSA.ppb* represents two data aggregation steps: 1) to aggregate terrestrial & aquatic the impacts are converted to MSA.parts per billion (ppb) by dividing by the total surface of the respective ecosystems. 2) to aggregate dynamic and static impacts and convert MSA.ppb to MSA.ppb*, the static impacts are divided by 50, which represents a biodiversity recovery time assumption of 50 years, and then combined with the dynamic impact figure.

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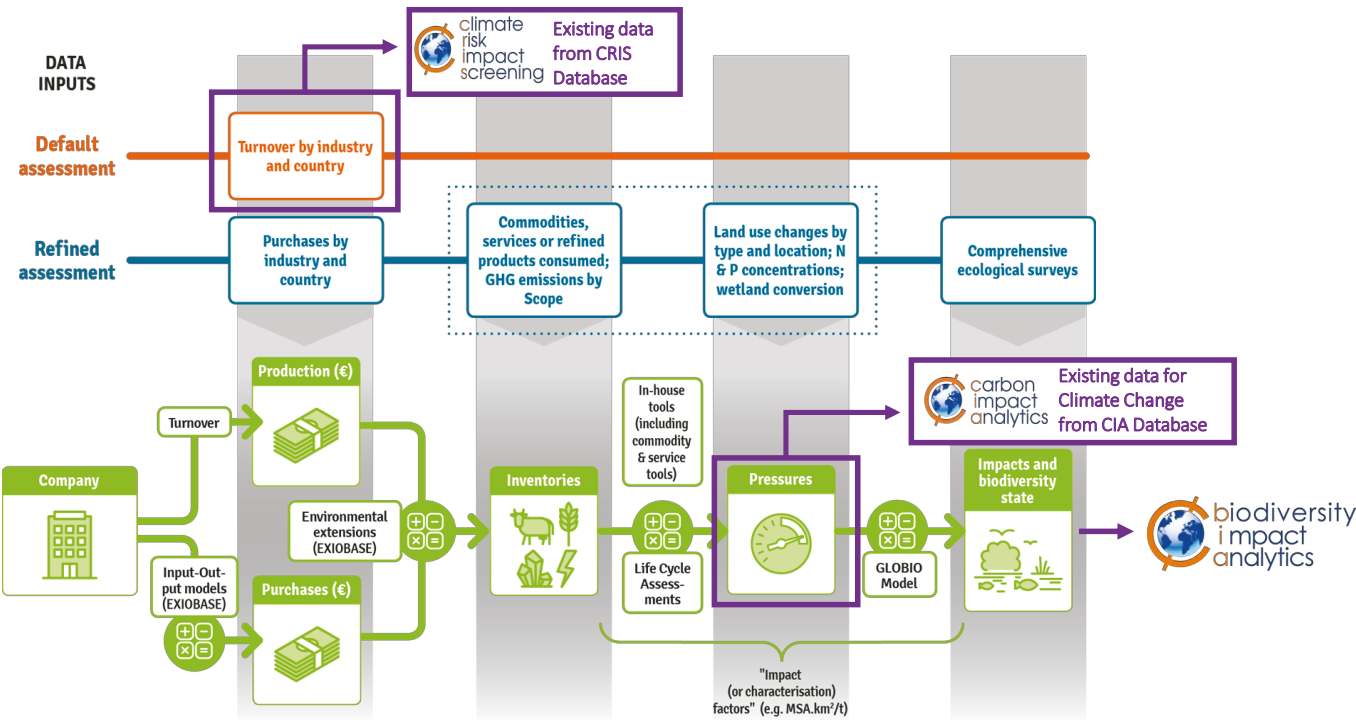
Source: CDC Biodiversité & Carbon4 Finance

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2.4.3 BIODIVERSITY FOOTPRINT FOR FINANCIAL INSTITUTIONS – ASN BANK ET AL.

The Biodiversity Footprint for Financial Institutions (BFFI) is designed to provide an overall biodiversity footprint of the economic activities a financial institution invests in. The methodology allows calculation of the environmental pressures and the biodiversity impact of investments within an investment portfolio (Lammerant, et al. 2021). Its ongoing development was led by ASN Bank of the Netherlands, together with the Dutch sustainability consulting firms CREM and PRé Sustainability, and has been applied to ASN Bank's business for the years 2014-2019, following the publication of its first footprinting exercise in 2016.

For a portfolio analysis, the BFFI uses indirect data from the EXIOBASE database for the assessment of the environmental pressures (resource use, emissions, etc.) caused by the economic activities the financial institution invests in. These EXIOBASE data are country-specific sector averages. More detailed biodiversity footprints can be made using company/project specific data and databases with emission and resource use of industrial processes. The environmental pressures are attributed to the investor based on attribution rules, like the share of the investment in the total value of the investee. The environmental effects are then translated into an impact on biodiversity using the ReCiPe model, which is based on best available knowledge regarding pressure-impact relations (e.g. the impact on biodiversity resulting from a

1 degree temperature rise) (CREM and PRe Sustainability 2019). These are expressed in terms of PDF.m2.yr, which is the potentially disappeared fraction of species in an area of a given size, over a given time period.

The methodology was first used to assess ASN Bank's balance sheet. Now, more financial institutions are using the BFFI (on a case study basis) to gain insight in the biodiversity impact across a variety of asset classes, including project finance, loans and mortgages, listed and unlisted equities and bonds, and investment funds. According to CREM and PRé Sustainability, it takes about 20 days to complete the assessment using sector and country average environmental data; incorporating company-specific data beyond publicly available financial information would take longer (Lammerant, et al. 2021). Some portions of the assessment are automated, while others are done manually. For listed assets in particular, the tool's developers have now included the coverage of a global equity index, as its primary coverage was originally limited to the companies in ASN Bank's equity and investment fund portfolios. This portion of BFFI appears to be in the process of being converted from a service provided by consultants into a more discrete user-accessible fully-automated database product, but as of April 2021 this was not readily available.

Figure 7: BFFI Methodology
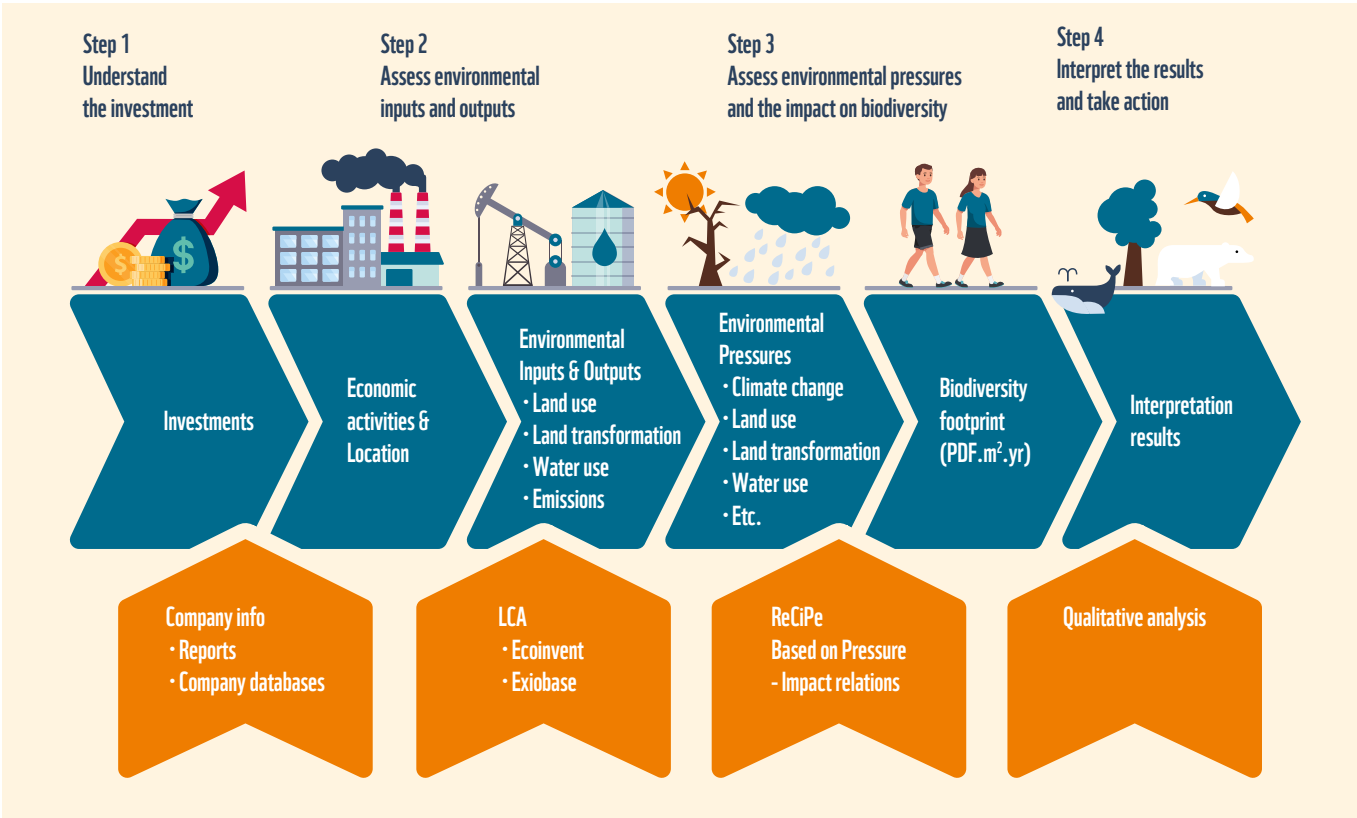
Source: Lammerant J. et al.

2.4.4 NET ENVIRONMENTAL CONTRIBUTION (NEC) – SYCOMORE AM ET AL.

The NEC is a relative-metric tool that measures the environmental impact of an economic activity, company or sector to determine a net contribution value on a -100% to +100% scale. Adopting a lifecycle approach, looking at impacts across the value chain, it provides a snapshot of an activity's net environmental contribution and can be applied at the company, portfolio, index or product/source level, on a global basis.

Its development was led by Sycomore AM, a French asset manager focused on responsible investment, together with environmental consultants I Care & Consult and Quantis. Parties interested in using the NEC are required to join the NEC Initiative, although IDL's CBF tool also provides NEC data. The metric has been applied to over 2,000 issuers, and has been shown to be responsive to corporate actions: in 2018, when Bayer acquired Monsanto (NEC of -62%), its 2018 NEC fell to -18% from the previous year's -2%.

To capture a comprehensive environmental footprint, for a given economic sector the NEC considers at least two of the following five issues: climate, water, resources and waste, air quality and biodiversity. The indicator is calculated on a scale from -100%, for the most damaging activities, to +100% for clear environmental solutions that fulfil the same given function. The metric is intended to provide an order of

magnitude of the net impact, with the 0% point defined as the average environmental impact of the function that the given activity is trying to fulfil. Figure 8 below shows how this assessment is represented for the mobility function. A company's total NEC is generated by summing its activity-level NECs, weighted by each activity's contribution to the company's financial performance. Correspondingly, an investment portfolio's NEC would comprise the weighted sum of the company-level NECs of the portfolio's constituents. (Sycomore AM, et al. 2019)

Company activities are assessed using one or more of 15 sectoral frameworks covering a specific value chain, such as waste, or a group of value chains providing a given function, such as transportation or electricity. Each of these frameworks is applicable to an industry or a group of industries, such as mining, metals and basic materials. In some cases, frameworks can be more granular, at sector or subsector level. (Sycomore AM, et al. 2019)

Figure 8: Default NEC, Mobility & Transport Framework
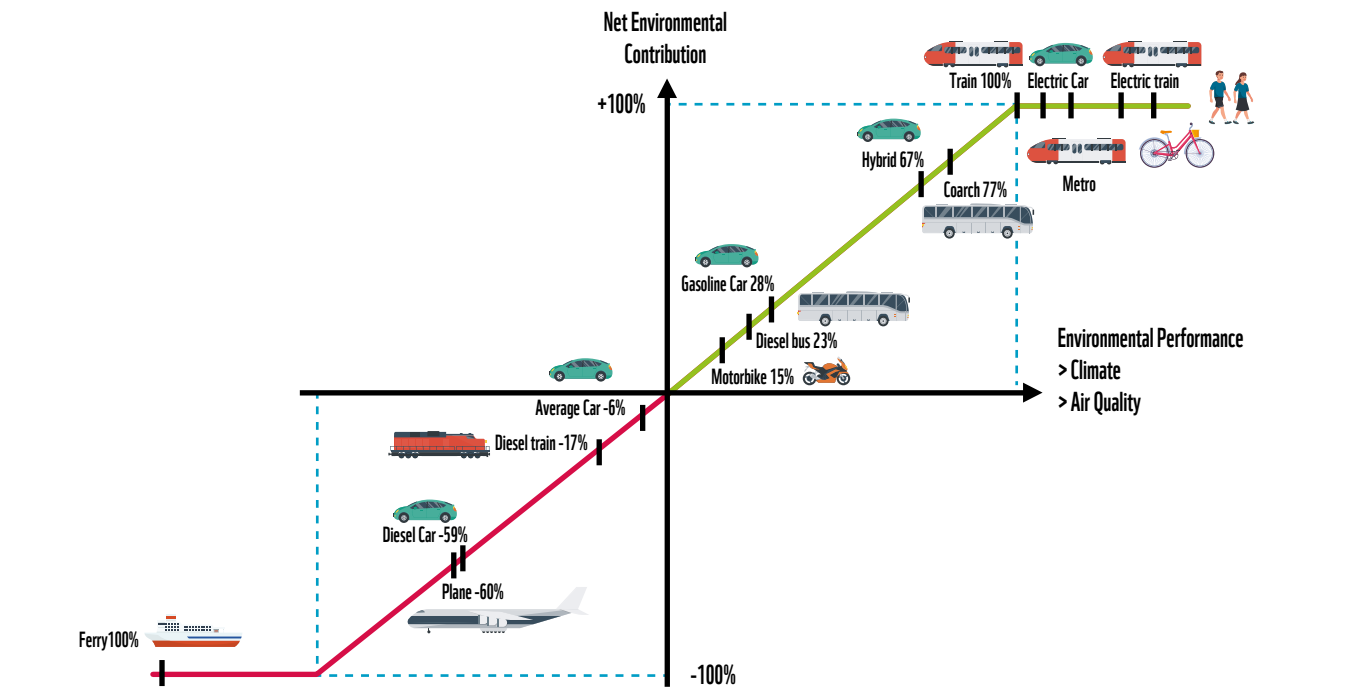
Source: NEC Initiative

2.4.5 PORTFOLIO IMPACT FOOTPRINT – IMPACT CUBED

Impact Cubed's Portfolio Impact Footprint (PIF) is a tool in the holistic impact measurement category. It quantifies a portfolio's impact footprint relative to a reference point (a benchmark/index), and defines a portfolio's net impact as the amount of active exposure it has to a set of sustainability-related factors. The methodology was developed over several years in partnership with the investment community (via over 10 investor workshops across 3 continents) and academics to be a holistic framework for assessing sustainability and impact.

The net impact figure is expressed in terms of the portfolio's tracking error[3] and represents how much of the fund's risk budget is spent on sustainability impact. For example, if a fund's total tracking error was 300 basis points (bps) and its active sustainability exposure came to 30 bps of tracking error, that means that only about 10% of the fund's risk (tracking error) was spent on sustainability impact.

The PIF tool examines 15 sustainability-related impact indicators that are a combination of ESG factors and SDG revenue alignment for products and services. The indicators chosen each describe a simple outcome that is measurable in absolute rather than subjective terms, such as the percentage of independent board members. Each indicator is either widely available via company disclosures or 3rd-party databases, or is able to be estimated, and relies on well-established external frameworks.

The net impact number indicates to what extent the portfolio is shifting capital from less sustainable companies towards more sustainable ones, as compared to the portfolio's reference benchmark. It thus provides a data-driven way to potentially validate – or invalidate – marketing claims of sustainability alignment.

A particularly interesting feature of the PIF is its ability to choose a particular date for the assessment, with availability going back to 2012. While much of the underlying data (other than share price) is unlikely to be updated on a daily basis, this "footprint backtesting" capability opens further potential avenues for portfolio testing and construction.

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[3]The difference between the performance of the portfolio and its reference benchmark.

Figure 9: The PIF Tool's Impact Indicators

Environmental	Governance	Business Model	Society
Carbon efficiency: Tonnes of Scope 1 and Scope 2 GHG emissions per US$1 million revenue	**Gender equality:** Percentage of women in top management and board	**Environmental good:** Revenue from environmentally positive products and services	**Economic development:** GDP per capita in US$ weighted by geographic distribution of the company's revenues
Waste efficiency: Tonnes of waste generated per US$1 million revenue	**Executive pay:** Ratio of companies' top management compensation compared to average employee compensation	**Avoiding environmental harm:** positive signal for avoiding companies with revenue from environmentally negative products and services	**Avoiding water scarcity:** World Resource Institute water scarcity score weighted by geography of operations, from 0-5 (least scarce=0)
Water efficiency: Thousands of cubic metres of fresh water used per US$1 million	**Board independence:** Percentage of independent board members	**Social good:** Revenue from socially positive products and services	**Employment:** Percent unemployment rate weighted by the company's geographic distribution of revenues
Scope 3 efficiency: Tonnes of Scope 3 GHG emissions emitted per US$1 million revenue		**Avoiding social harm:** positive signal for avoiding companies with revenue from socially negative products and services	**Tax gap:** How much companies pay in taxes compared how much they would be expected to pay based on the geographical spread of their operations

Source: Impact Cubed

2.4.6 SUSTAINABLE INVESTMENT FRAMEWORK NAVIGATOR (SIFN) – KPMG & CISL

In 2019, the University of Cambridge Institute for Sustainability Leadership (CISL) published a report introducing their Sustainable Investment Framework (CISL 2019), developed and refined over a period of three years with involvement of the Investment Leaders Group, a group of leading institutions in the investment industry coordinated by CISL. The framework is designed to quantify the social and environmental performance of investment funds against six themes derived from the Sustainable Development Goals.

In 2020, CISL and KPMG partnered to build an online tool around the framework with one goal in mind: making it easier for investors and FIs to measure and visualize the impact of their portfolios. The result is the SIFN, a software application with an integrated data library, ensuring a plug & play solution. The framework's methodologies are publicly available alongside the tool to ensure transparency to users as to how impact is calculated.

The SIFN is intended to act as a first step in an institution's impact assessment and reporting journey and enable advanced impact professionals to make comparisons between portfolios and other institutions. The framework and the SIFN tool aim to help investors measure the aggregate impact of assets at a fund level. Its generalised thematic approach transcends sectors, asset classes, investment styles, and geographies; the metrics in the tool are most readily applicable to corporate bonds and equities owing to the relative abundance (and consistency) of data compiled on these asset classes.

The SIFN measures portfolio impact along six key themes, derived from the SDGs: Basic Needs, Wellbeing, Decent Work, Resource Security, Healthy Ecosystems and Climate Stability. The outcomes of the portfolio are then compared to a self-selected/created benchmark.

After uploading the holdings for a portfolio and its benchmark, the SIFN automatically generates an overview of the sustainable investment outcomes:

The framework upon which the SIFN is built follows a pragmatic approach to data availability. It acknowledges there is a gap between what can be measured today and what the ideal measure would be if improved data were available. To meet the challenge of a current lack of impact data, CISL's approach has created a starting point, focusing on current metrics (sourced from company disclosures or 3rd-party databases) and working towards an "ideal framework" facilitating better measurement of sustainable investment outcomes as impact data collection and disclosure improves over time.

The six impact themes are summarised in the figure below alongside the proposed ideal metrics and the metrics that can be measured today. The partners expect to develop and revise these metrics to align with current and forthcoming regulations; and to reflect market trends, input from SIFN users, and further research by CISL and the Investment Leaders Group.

Figure 10: Example of SIFN Impact Theme Overview

Source: KPMG & CISL

Figure 11: Overview of the ideal and base metrics of CISL's Sustainable Investment Framework

Theme	Description	What is the ideal measure?	What can be measured today?
Basic needs	The provision of critical services to all in society, including low-income people to help them escape poverty.	Total revenue from products and services addressing the basic needs of low income groups, adjusted by PPP-weighted International Poverty Line. Unit: US$	Total revenue from goods and services from clothing, communication, education, energy, finance, food, healthcare, housing, sanitation, transport and water. Unit: US$
Wellbeing	Enhanced health, education, justice, and equality of opportunity for all.	Total tax contribution (comprising taxes on profits, people, production, property and environment but not sales) by country, adjusted by national corruption and spending effectiveness. Unit: US$	Total tax contribution Unit: US$
Decent work	The creation of secure, socially-inclusive jobs and working conditions for all.	Total number of open-ended employment contracts excluding jobs below 60 percent median wage and jobs in poor working conditions, adjusted by national employment rate. Unit: number of jobs	Total number of employees based on full time equivalent (FTE) workers. Unit: number of FTEs
Resource security	The preservation of natural resources through efficient and circular use.	Hard commodities: Virgin material content of end products plus waste lost to the environment. Soft commodities: Non sustainably certified content of end products plus waste not specifically returned to nature. Unit: metric tonnes (t)	Total net waste (total waste arising - total waste recycled). Unit: metric tonnes (t)
Healthy ecosystems	The maintenance of ecologically sound landscapes and seas for people and nature.	Area of land utilized by an asset in degraded form. Unit: hectares (ha)	Fresh water use (surface water + groundwater + municipal water) Unit: cubic metres
Climate stability	The global effort to curb the Earth's temperature rise, and an asset's alignment with the Paris consensus to hold temperature rises 'well below' 2°C.	Alignment to future warming scenario based on consumption of global carbon budget. Unit: degrees Celsius.	Total greenhouse gas (GHG) emissions (Scope 1 and 2). Unit: tonnes (t) carbon dioxide equivalent

Source: CISL 2019

2.4.7 POSITIVE IMPACT ANALYSIS TOOL FOR BANKS – UNEP FI POSITIVE IMPACT INITIATIVE

The open-source Portfolio Impact Analysis Tool for Banks is designed to guide banks through a holistic (i.e., not solely environmentally focused) impact self-analysis of their retail and wholesale banking portfolios. Under the auspices of the Positive Impact Initiative (PII) of the United Nations Environment Program Finance Initiative (UNEP FI), it was developed jointly with signatories of the Principles for Responsible Banking (PRB) and UNEP FI Member Banks. The PII is focused on addressing the SDG financing gap, and includes a group of finance sector members of UNEP FI as well as public and private sector stakeholders beyond the finance sector. (UNEP FI 2020)

The tool was designed to support signatories of the PRB in their efforts to achieve PRB Principle 2:

"We will continuously increase our positive impacts while reducing the negative impacts on, and managing the risks to, people and environment resulting from our activities, products and services. To this end, we will set and publish targets where we can have the most significant impacts."
(UNEP FI 2019)

Figure 12: The Positive Impact Initiative Impact Radar

Source: UNEP FI 2020

As such, it allows banks to identify their most significant impact areas at the portfolio level, with a view to developing their business strategy and setting themselves targets to increase their positive impacts and decrease their negative impacts, in the impact areas that are most significant, based on the nature, content and location of their portfolios. The impact areas considered in the tool are those listed and described in PII's Impact Radar (see below), a set of impact categories derived from the core elements of sustainable development and explicitly linked to the SDGs.

The tool is incorporated into a freely downloadable Excel spreadsheet. Other support materials are also available, including a user guide with embedded tutorials as well as video walkthroughs of early users. Users input data to describe their portfolio and to reflect their current impact performance.

The use of the tool is split into two phases. Phase I is concerned with impact identification – helping the bank understand which impact areas it should focus on based on its business portfolio and operational geographies. This involves inputting an overview of the bank's business activities and mapping impact needs in the bank's countries of operation. The tool uses this data together with a set of in-built impact mappings to produce a set of impact profiles by business line that illustrate the bank's potential impacts by business line. It guides the user in self-identifying the bank's most significant positive and negative impact areas and determining priorities, thus setting the basis for strategy development and target-setting. (UNEP FI 2020)

Phase II is the tool's assessment phase. Once the significant impact areas have been identified, the bank's performance across these areas is self-assessed by reviewing the bank's actual quantitative and/or qualitative relevant data (supplied by the user), peer benchmarking, policy alignment, and whether the bank has faced any controversies related to these impact areas. The tool integrates this with the Phase I data to display the bank's performance against its priority impact areas. The figure below shows an example of this output for one business line in one country. (UNEP FI 2020)

Canada

	Impact areas - Positive associations	performance status		Impact areas - Negative associations	performance statu
Rank			Rank		
1	Inclusive, healthy ec	Good	1	Resources efficiency	Uknown
2	Housing	A priori good	2	Climate	Poor
3	Mobility	Good	3	Economic convergend	Poor
4	Justice	Uknown	4	[please select an im	[please select]
5	[please select an im	[please select]	5	[please select an im	[please select]

Source: UNEP FI 2020

This summary can be used by the bank to prioritise action and set targets, particularly in areas where performance is poor. The bank may also use the results to identify and examine areas where potential impact is high but the bank's performance is unknown, or where there are business opportunities that play to identified strengths.

While this tool is currently focused on determining the impact of banking activities, future updates are likely to incorporate additional finance sector activities, including asset management and insurance. Version 2 of the Portfolio Impact Analysis Tool for Banks was launched in April 2021 with various new features (e.g. data visualization) and user experience enhancements.

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CASE STUDIES

To get a concrete idea of how the different tools compare in terms of outputs provided and the types of investor needs met, a simple portfolio was constructed to be put through a selection of the tools covered in this report.

The tools chosen – Corporate Biodiversity Footprint, Biodiversity Impact Analytics, Portfolio Impact Footprint and Sustainable Investment Framework Navigator – were selected based on the assessment target and ease of use criteria articulated in section 2.3, focusing on tools with portfolio investors as the primary intended user and which provide (or will soon provide) results essentially instantly. A further selection consideration was the ability to test two tools each in both of the key tool categories discussed above, namely biodiversity-specific and holistic.

3.1 SAMPLE PORTFOLIO

The sample portfolio comprises 10 names, all taken from the agri-food sub-industries within the Consumer Staples sector of the Global Industry Classification System (GICS) developed by MSCI and Standard & Poor's. Given the limited number of names, equal weighting (10%) was deemed appropriate, and for those tools requiring an investment amount, US$10 million per name was chosen, resulting in a notional US$100 million portfolio (or euro, depending on tool configuration). For those tools requiring a reference index, the MSCI World Index was selected, or a close approximation.

Geographically, the portfolio is concentrated on US and European names but also includes representation from Japan, Singapore, and Brazil. Because the MSCI World Index is a developed-market index, the inclusion of names from Brazil means that the portfolio and the index do not overlap completely, but this should not present a major issue for the comparison. The sample portfolio is shown in Figure 14 below.

The broad agri-food sector was chosen in large part due to the fact that this sector is the largest driver of nature and biodiversity loss, primarily from land use. According to a report from UNEP FI and Global Canopy, the agricultural products sector was the only one examined that had both a high impact on biodiversity and high dependency on the ecosystem services that are underpinned by biodiversity (UNEP FI and Global Canopy 2020). As such, it is also one of the sectors prioritized by the biodiversity footprinting tools in terms of building out coverage. As it is more challenging for these tools to expand their coverage universe as rapidly as the holistic tools, it was determined that a portfolio focused on this sector was more likely to be able to be assessed by the biodiversity tools.

With respect to the holistic tools, one key implication of this choice of sector focus is that the sample portfolio is likely to perform poorly against the reference benchmark in environmental terms.

Figure 14: WWF Sample Portfolio

COMPANY NAME
Archer Daniels Midland (ADM)
Asahi Group Holdings
Danone
JBS S.A.
Mondelez International
Nestle
Pepsico
The Coca-Cola Company
Tyson Foods
Wilmar International

Source: WWF

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3.2 CASE STUDY 1 – BIODIVERSITY SPECIFIC: CORPORATE BIODIVERSITY FOOTPRINT

IDL's Corporate Biodiversity Footprint currently provides coverage of issuers operating in the sectors with the highest impact on biodiversity belonging to the MSCI ACWI Index, with full index coverage targeted by 2022. As a result, the tool covered 6 of the 10 names in the sample portfolio, and IDL chose 6 additional names from the agri-food sector to fill in the gaps and ensure a similar geographic spread, resulting in a 12-name portfolio. Campbell's Soup, General Mills, Kellogg's, Kikkoman, Kraft Heinz, and Want Want China Holdings took the place of ADM, Asahi Group, Coca-Cola, and Wilmar International.

The tool generates two primary metrics – the Corporate Biodiversity Footprint (CBF) and CBF ratio – on a company-by-company basis, together with an indication of data quality and some descriptive comments. An example of the headline results, for fiscal 2019, is shown in the figure below.

The CBF indicates the absolute biodiversity loss caused by annual company activities and their related contribution to environmental pressures, expressed as a negative km2 MSA figure (more negative = worse). For the sample portfolio, Nestle and Kikkoman had the largest and smallest respective total absolute impacts. As expected for companies in the sector, land use was the most significant pressure, comprising over 90% of the absolute total.

The CBF ratio allows for comparisons between companies of different sizes, by dividing the CBF figure by the company's capital employed (per million euros). It also enables the calculation of portfolio-level absolute biodiversity impact, which is the total of each company's CBF ratio multiplied by the amount invested in the company (whether via equity, bond, or credit).

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Figure 15: CBF Total Biodiversity Impact – WWF Sample Portfolio (Modified)

COMPANY	Biodiversity Impact Total			
	CBF km² MSA	CBF ratio km² MSA/€ Mn	Data Quality	Comment
Campbell Soup	DATA OBSCURED	-0.178	3	DATA OBSCURED
Danone		-0.022	3	
General Mills		-0.029	3	
JBS S.A.		-0.231	2	
Kellogg		-0.314	3	
Kikkoman		-0.033	3	
Kraft Heinz		-0.015	2	
Mondelez		-0.241	3	
Nestle		-0.384	2	
Pepsico		-0.122	3	
Tyson Foods Inc		-0.214	3	
Want Want China Holdings Limited		-0.410	3	

Source: Iceberg Data Lab (company names listed in alphabetical order)

For the sample portfolio, this figure is -21.9 km² MSA (assuming €10m invested per company). This indicator also shows that Want Want and Kraft Heinz had the largest and smallest respective biodiversity impacts per million € employed. The figure below shows the spread of the CBF ratio for the portfolio – simply eliminating the 3 worst performers would cut the portfolio's aggregate impact by almost 50%.

Figure 16: CBF Ratio – WWF Sample Portfolio Constituents

Portfolio Constituents Sorted by CBF Ratio
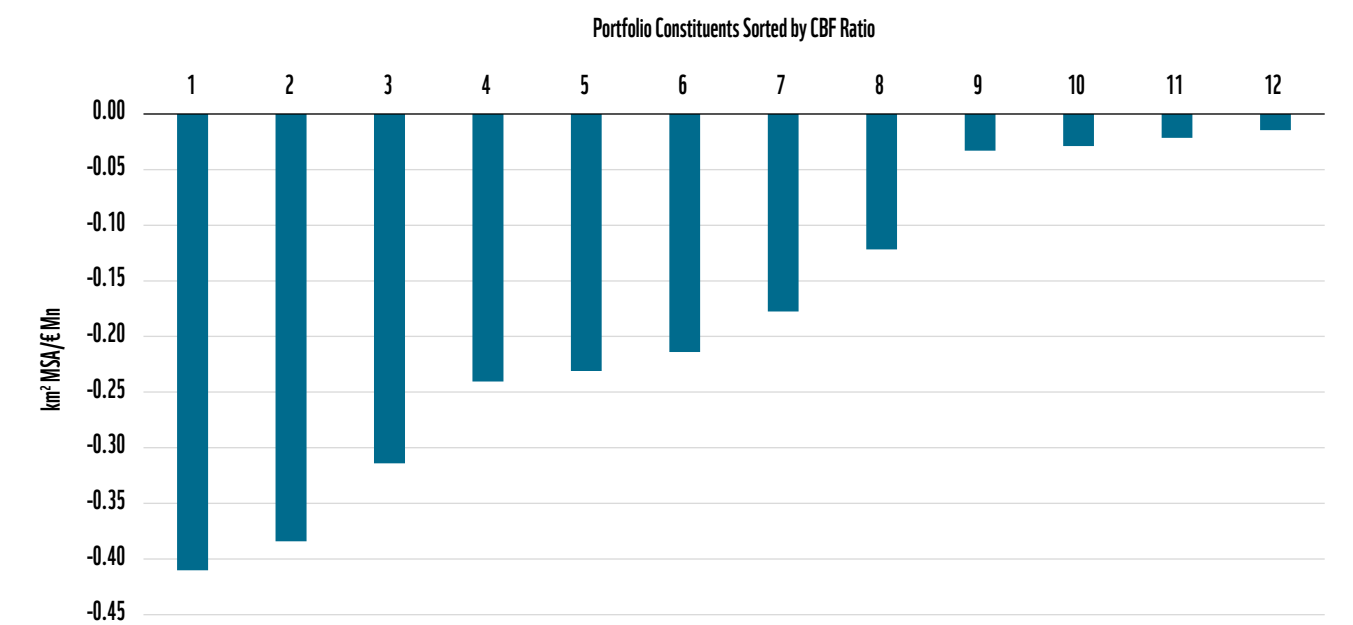
Source: Iceberg Data Lab, WWF

In addition to the total impact figures, the tool also provides figures for each of the four component environmental pressures (land use, air pollution, GHG emissions, water pollution). Sorting by these factors changed the leaders and laggards of the portfolio – in particular, the two meat processors (JBS and Tyson Foods) generated roughly ⅔ to ¾ of the portfolio's impacts coming from emissions of greenhouse gases as well as nitrogen oxides, in both absolute and size-adjusted terms.

While the results received for this report came in the form of a spreadsheet, IDL is in the process of developing an online platform to provide company- and portfolio-level data and analysis for uploaded portfolios, including time series data, company peer comparison, and portfolio aggregation. This is expected to launch by mid-2021. A mock-up of the company details page for McDonald's is shown in Figure 17 below.

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Figure 17: Mock-up of CBF Online Platform Company Details Page – McDonald's
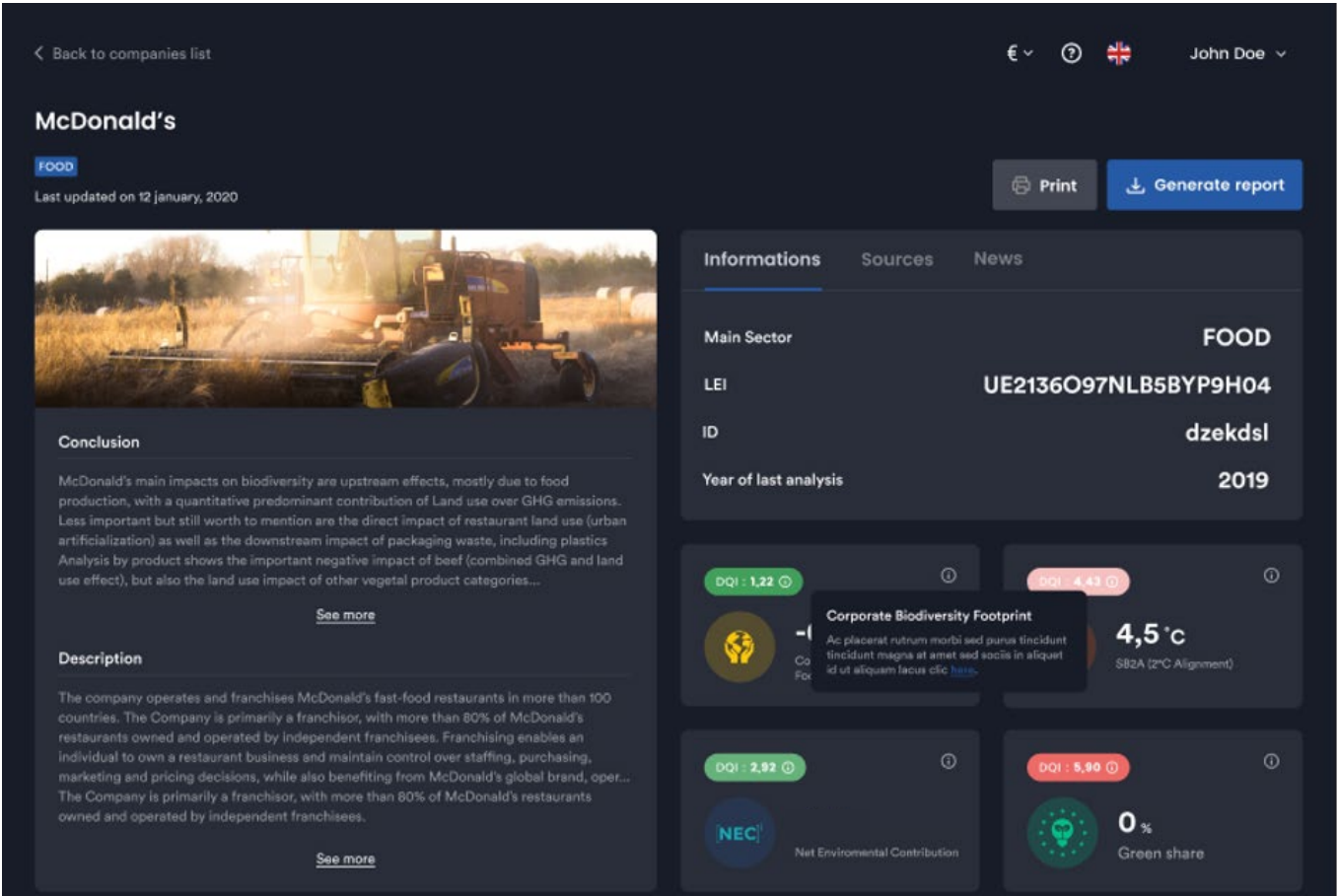
Source: Iceberg Data Lab

3.3 CASE STUDY 2 – BIODIVERSITY SPECIFIC: BIODIVERSITY IMPACT ANALYTICS

Although the BIA-GBS® tool was still in its pre-launch stage of development (launch expected by April 2021), CDC Biodiversité and Carbon4 Finance were able to run the sample portfolio with some slight modifications – JBS S.A. was replaced by both General Mills and Campbell Soup, resulting in a 11-name portfolio notionally valued at €110m.

According to the tool's GBS® methodology, the sample portfolio's absolute footprint totals 170 MSAppb* (larger = worse), the tool's metric that integrates terrestrial, aquatic, dynamic, and static impacts. The majority of the impacts are static (persistent) rather than dynamic (occurring during the period assessed) reflecting the fact that the assessed activities are very intense in terms of land occupation. The three companies with the highest impact footprint – Tyson Foods, Wilmar International, and ADM – generate over 80% of the portfolio's biodiversity footprint.

The results are displayed in the figure below. The following indicators are available for all asset classes (equity, corporate bonds, and sovereign bonds):

• global aggregated biodiversity footprint in MSAppb* per billion euros invested

• a breakdown of absolute impacts in MSA.km² for the 4 combinations of terrestrial/aquatic and dynamic/static

• performance relative to sectoral and global benchmarks

• absolute impacts breakdown per Scopes or pressures

• dependency score

• the ability to download associated raw data

The tool also provides company-level outputs, including data transparency such as a breakdown of company activity by sector together with the share of company turnover per sector.

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Figure 18: BIA-GBS®'s Portfolio Dashboard – WWF Sample Portfolio (Modified)
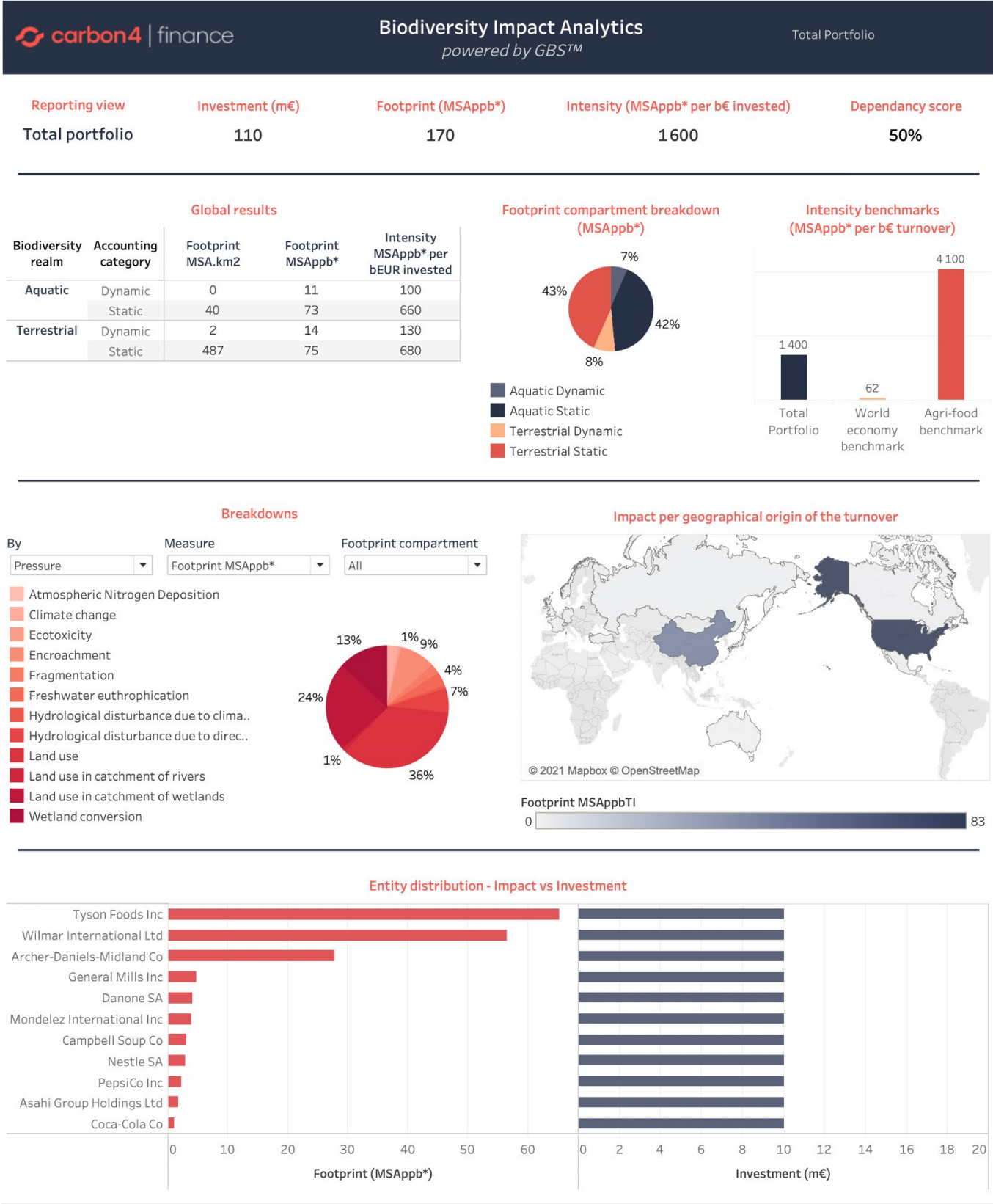
Figure 19: BIA-GBS®'s Company-Level Output – WWF Sample Portfolio, Tyson Foods Inc.
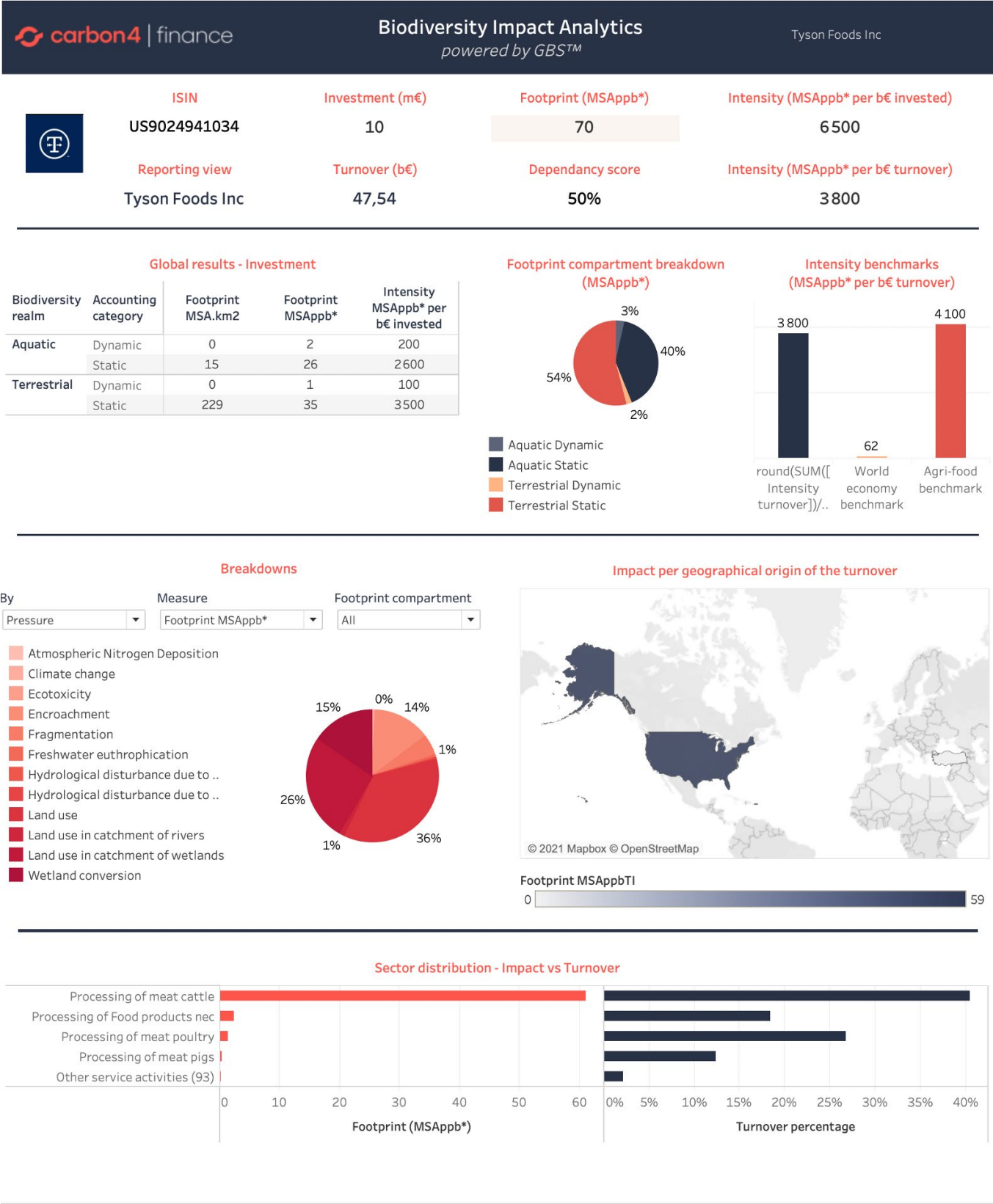
3.4 CASE STUDY 3 – SDG/ESG HOLISTIC: PORTFOLIO IMPACT FOOTPRINT

The WWF sample portfolio performed poorly relative to benchmark under Impact Cubed's PIF assessment, as expected. Net impact was -135 basis points (bps) out of an estimated total tracking error relative to benchmark of 1,479 bps.

This means that the portfolio's exposures to positive impact sustainability factors were significantly outweighed by its negative factor exposures, with a positive impact of 44 bps and negative impact of -179 bps. The model generates these figures by calculating the portfolio's weighted average performance along each sustainability indicator, and then determining the tracking error of a minimum-variance portfolio[4] with the same positive and negative factor exposures. These are then summed to yield a net positive or negative impact number, expressed in basis points of tracking error.

This -135 bps of net impact came from an estimated 30% positive active ESG shares and -100% negative active ESG shares (net -70%), where active ESG shares represent the active part of the portfolio that creates the impact. Active ESG shares is a metric used in the process of deriving the basis point impact number, and is equal to the percent active weights relative to the benchmark of the minimum variance portfolio that achieves active factor exposures at least equal to that of the portfolio being analysed (Impact Cubed 2018).

For the sample portfolio, the positive impact came mainly from the portfolio having more economic activity in less developed economies, while the bulk of the negative impact stemmed from the business model indicators. "Avoiding social harm" and "avoiding environmental harm" fared the worst vs benchmark, compounded by the fact that none of the portfolio's components had revenue from the "environmental good" indicator, and only one had revenue from "social good" products.

These business model indicators tag products and services as environmentally or socially positive, negative, or neutral, with a given company's performance determined by revenue from the relevant categories. This in-house industry classification system was developed by Impact Cubed specifically for mapping SDG alignment and for sustainability screening. It errs on the side of caution, so the neutral category is by far the largest (Impact Cubed 2018).

The summary performance of the sample portfolio is shown in Figure 20 below. For the circular impact graph, the dark blue circle represents the benchmark, while the light blue line

shows the portfolio's active factor exposures relative to the benchmark's exposures. Points inside the benchmark circle represent negative impact, and vice versa for positive impact, with more distance from the benchmark circle indicating more impact, whether positive or negative.

_____

[4]A low-risk portfolio with the lowest volatility for a given expected rate of return.

Figure 20: PIF Main Results Page – WWF Sample Portfolio
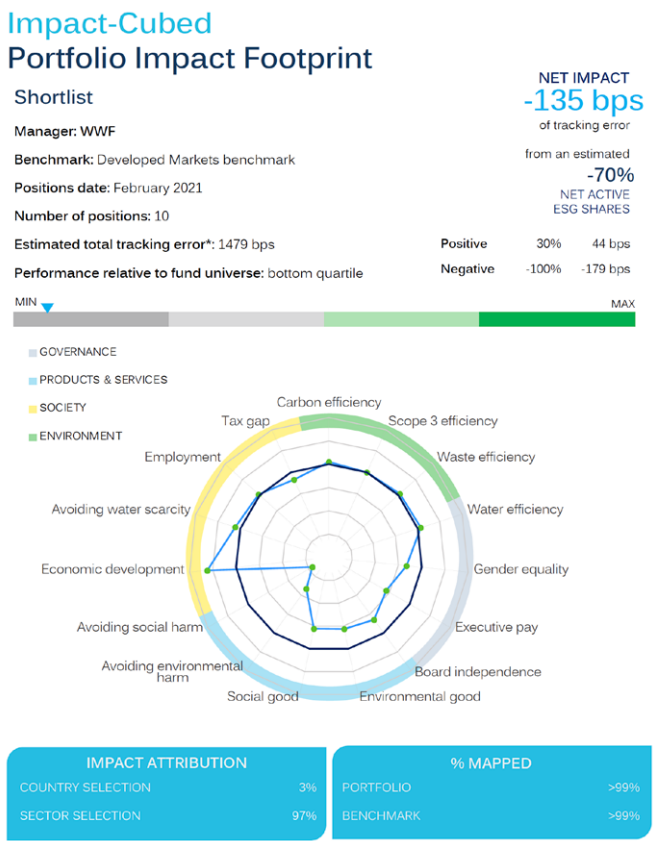
Source: Impact Cubed

The Portfolio Impact Footprint report also provides the raw impact data on a per-indicator basis, showing the weighted average of the portfolio and the benchmark side by side. These fund impact measures provide some numerical context for the circular impact graph.

This is also translated into investment equivalents relative to the benchmark and linked to the SDGs, shown in Figure 22 with positive/negative impacts in green/red. For example, US$1 million invested in the WWF sample portfolio (called "Shortlist" by Impact Cubed for the purposes of this case study) finances 54 fewer tonnes of waste as compared to the

PIF's Developed Markets benchmark (an approximation of the MSCI World Index).

The report also gives the best- and worst-performing companies for each impact indicator. As the portfolio's worst-performing name in the "avoiding social harm" category was Coca-Cola, sugary soft drinks are clearly categorised as negative within Impact Cubed's industry classification system. The worst performer in terms of "avoiding environmental harm" was JBS S.A., which makes sense given its position as a leading global meat processor.

Figure 21: PIF Fund Impact Measures – WWF Sample Portfolio

FUND IMPACT MEASURES					% data estimated fund/benchmark
	Fund	Benchmark	Based on company reported		
Carbon efficiency	101.79	142.43	tons of GHG (Scope 1 & 2) emissions per $1M revenue	27%	25%
Scope3 efficiency	414.52	419.44	tons of Scope 3 emissions per $1M revenue	5%	52%
Waste efficiency	26.39	324.30	tons of waste generated per $1M revenue	5%	44%
Water efficiency	2.41	5.52	thousand cubic metres fresh water used per $1M revenue	4%	45%
Gender equality	21.2%	24.7%	percentage of women in boards and top management	0%	1%
Executive pay	85.1	59.0	ratio of executive level pay to average employee pay	27%	24%
Board independence	71.1%	79.1%	independent board members	0%	2%
Environmental good	0.0%	12.8%	portfolio allocated to environmental solutions	n/a	n/a
Social good	0.1%	12.1%	portfolio allocated to help alleviate social issues	n/a	n/a
Avoiding environmental harm	29.5%	4.0%	portfolio allocated to environmentally destructive industries	n/a	n/a
Avoiding social harm	35.7%	4.1%	portfolio allocated to industries aggravating social issues	n/a	n/a
Economic development	$40,300	$48,700	median income of portfolio weighted geography of economic activity	n/a	n/a
Avoiding water scarcity	2.45	2.51	geographic water use (World Resource Institute scale 0-5 from most to least water scarce areas)	n/a	n/a
Employment	5.7%	5.7%	unemployment in portfolio weighted area of economic activity	n/a	n/a
Tax gap	3.25%	2.72%	estimated % tax avoided by corporate tax mitigation schemes	n/a	n/a

Source: Impact Cubed

Figure 22: PIF Investment Equivalents – WWF Sample Portfolio

INVESTMENT EQUIVALENTS			
In real terms compared to the Developed Markets benchmark, $1M invested in Shortlist finances:			
		Real world equivalent	SDG relevance
Carbon efficiency	-20.27	more tons of GHG emissions	7, 15
Scope3	-115.77	more tons of Scope 3 emissions	
Waste efficiency	54.17	less tons of waste generated	6, 12, 14, 15
Water efficiency	0.0	less thousand cubic metres fresh water used	6
Gender equality	-3.5%	less women in top management	5
Executive pay	-26.1	more multiples of average employee pay paid to top executives	10
Board independence	-8.0%	less board independence	10, 16
Environmental good	-12.8%	less invested in industries contributing to solving environmental issues	most SDGs
Social good	-12.0%	less invested in industries helping alleviate social issues	most SDGs
Avoiding environmental harm	-25.5%	more invested in industries aggravating environmental issues	most SDGs
Avoiding social harm	-31.6%	more invested in industries aggravating social issues	most SDGs
Economic development	$ 8,300	more economic activity in less developed economies	1, 8, 9, 16, 17
Avoiding water scarcity	0.07	less water use in water scarce localities (World Resource Institute)	16, 17
Employment	0.0%	more economic activity in high unemployment geographies	1,8, 11, 12, 16
Tax gap	-0.53%	less tax paid	1, 9, 10, 16

Source: Impact Cubed

3.5 CASE STUDY 4 – SDG/ESG HOLISTIC: SUSTAINABLE INVESTMENT FRAMEWORK NAVIGATOR

The WWF sample portfolio performed poorly relative to benchmark on the SIFN's environmental measures, as expected due to the nature of the investments, but did reasonably well on the socially-related themes. The results are displayed in the figures below.

Companies such as JBS SA (largest meat processing company in the world), Tyson Foods (second largest meat processing company in the world after JBS), ADM (food processing) and Wilmar International (food processing), all score in the lowest percentile range relative to benchmark and have high to very high Scope 1 and Scope 2 CO2 Emissions.

When looking at freshwater consumption, all the holdings fall within the bottom 60%. JBS SA, Tyson Foods and ADM have very high values for freshwater consumption in comparison to the benchmark.

Although the four companies mentioned all score low when looking at the environmental factors, they score relatively positively when looking at basic needs, wellbeing and decent work - with sales revenue turnover all in the top 20%. Full details by company are shown in Figure 24.

## Figure 23: SIFN Primary Results Page – WWF Sample Portfolio

Source: KPMG
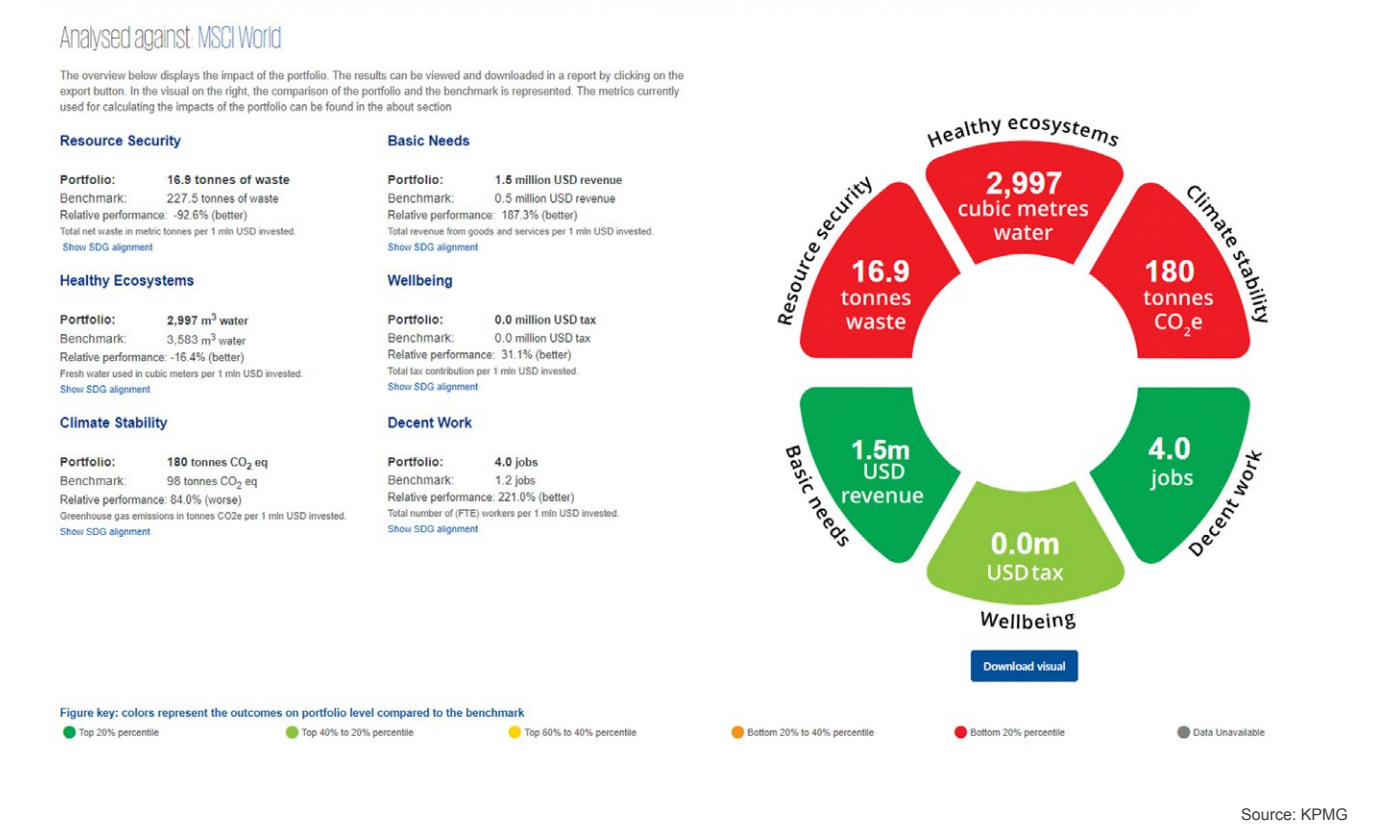
Figure 24: SIFN Individual Holding Performance Details – WWF Sample Portfolio

Figure key: colors represent the outcomes on portfolio level compared to the benchmark

● Top 20% percentile   ● Top 40% to 20% percentile   ● Top 60% to 40% percentile   ● Bottom 20% to 40% percentile   ● Bottom 20% percentile   ● Data Unavailable

Impact Results of Individual Holdings

ISIN Code	Issuer Name	Weight	Basic Needs	Wellbeing	Decent Work	Climate Stability	Healthy Ecosystems	Resource Security
CH0038863350	NESTLE SA	10.0%	●	●	●	●	●	●
US6092071058	MONDELEZ INTERNATIONAL INC CLASS A	10.0%	●	●	●	●	●	●
US7134481081	PEPSICO INC	10.0%	●	●	●	●	●	●
US1912161007	COCA-COLA	10.0%	●	●	●	●	●	●
FR0000120644	DANONE SA	10.0%	●	●	●	●	●	●
JP3116000005	ASAHI GROUP HOLDINGS LTD	10.0%	●	●	●	●	●	●
SG1T56930848	WILMAR INTERNATIONAL LTD	10.0%	●	●	●	●	●	●
US9024941034	TYSON FOODS INC CLASS A	10.0%	●	●	●	●	●	●
BRJBSSACNOR8	JBS ON	10.0%	●	●	●	●	●	●
US0394831020	ARCHER DANIELS MIDLAND	10.0%	●	●	●	●	●	●

Source: KPMG

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3.6 CASE STUDIES: IMPLICATIONS AND INTERPRETATION

3.6.1 ANALYSIS

The two sets of tools highlighted in these case studies are targeting different users with different needs. Therefore, the footprint results from the biodiversity tools cannot be compared with the results on environmental factors from the holistic tools. Even within the same tool category, the results are not directly comparable with each other, because they use different data sources, modelling approaches, and/or metrics. They also use different ways to present their results visually.

FIs (potential users) should examine these differences in order to ensure they choose the most appropriate tool for their needs. However, as these tools evolve further and expand their user bases, some level of harmonization would be helpful to scale up the application of the tools, such as using the same metrics or indicators for measuring the same type of impact (e.g. using MSA instead of PDF for biodiversity impacts, or looking at taxes paid instead of taxes avoided for one type of social impact).

The summary below presents a comparative analysis of the biodiversity-specific tools and the holistic tools.

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CASE 1 VS CASE 2: BIODIVERSITY-SPECIFIC TOOLS

For the biodiversity-specific tools, the results are not directly comparable with each other even for the same company, because the developers have taken slightly different approaches to aggregating the environmental pressures they measure to arrive at their output. CBF's focus on four major pressures simplifies the communication of its output at the expense of some granularity in assessment, while BIA-GBS®'s higher level of granularity (10 pressures assessed) results in a more complex presentation of its output. That said, both assessments showed that the sample portfolios assessed exhibited a significant amount of concentration in their biodiversity footprints, with 50%-80% of the portfolios' impact concentrated in the three companies with the highest impact in each portfolio.

CASE 3 VS CASE 4: HOLISTIC (SDG) TOOLS

As the holistic tools are both SDG-oriented, they assess impact across similar categories of metrics, although as with the biodiversity tools they differ in terms of granularity. Both tools showed the sample portfolio performing relatively poorly on environmental metrics and somewhat better on the non-environmental ones. The SIFN output, deliberately limited to 6 themes, appears to be pitched in such a way that the headline results can be readily presented to retail-level clients without modification by users of the tool, while still providing sufficient company-level granularity to allow for screening and other prioritisation efforts at the portfolio construction and operation level. In contrast, the PIF output is somewhat more complex and uses language that is more clearly targeted at portfolio investor professionals. While the PIF output does identify the top and bottom performers, it does not provide full company-level granularity across each of its 15 assessment factors, although this is likely addressable as a custom option for fully paid users of the tool.

3.6.2 STRENGTHS AND LIMITATIONS OBSERVED FROM THE CASE STUDIES

BIODIVERSITY-SPECIFIC TOOLS

From the user point of view, having even a baseline first approximation of a company or portfolio's biodiversity footprint is a critical first step towards a meaningful integration of biodiversity into their investment processes. For an assessed portfolio or investment universe, the output allows the user to sort constituents by biodiversity footprint on an absolute or per-dollar invested basis, thus prioritising companies for engagement or screening. This is similar to how carbon-aware investors began dealing with CO_2; as such, the investment process pathways already exist in many cases and can be re-tooled to include biodiversity. As both biodiversity-specific tools employ similar methodologies, they share core strengths and limitations.

STRENGTHS

- **Credibility and transparency:** They take great pains to ensure the scientific validity of their results, not only by using open-source scientific databases as key inputs, but also through ongoing engagement with the scientific community on their tools' methodologies and continuing development.

- **Ease of use:** From an investor's standpoint the tools are easy to use, and the MSA metric is relatively straightforward to comprehend for non-specialists, after a certain amount of training on biodiversity concepts. The tools provide investors with the ability to quantify their impact on biodiversity at the portfolio and individual constituent level, across multiple asset classes.

- **Time saved:** The insights gained from the biodiversity-specific tools previously would have required biodiversity-focused investors to expend significant effort over an extended period of time for a portfolio of even as few as 50 names. The tools' elimination of this required effort may thus enable a larger population of investors to integrate biodiversity into their investment processes.

LIMITATIONS

- **Need for site-level data:** Without company-specific site-level data[5], two companies with similar activities in the same countries will have almost identical results from a given tool even if they are operating in very different local environments in each country. This is an important limitation and challenge for these tools, recognized by their developers as such.

- **Limitations of coverage in the underlying open-source scientific databases:** While they cover numerous types of pressures on terrestrial and freshwater biodiversity, they currently provide limited to no coverage of other key topics such as marine biodiversity, invasive species, and overexploitation. The geographical resolution is also limited, with some countries covered at the country level and others grouped into larger regions.

- **Limited coverage of companies for now:** Both of the biodiversity-specific tools needed to make substitutions or concentrated efforts to add specific companies due to gaps in coverage at this point, although those gaps will be filled over time.

- **Cost:** At tens of thousands of euros per year for each tool at present, cost considerations may limit uptake to the largest investment firms over the medium term.

- **Unfamiliar topic for investors:** As mainstream investors have typically had limited engagement with biodiversity issues so far, it may be challenging to attract serious interest from them. Once they do, the tool developers will likely need to educate their customers about the key concepts involved.

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[5] It is important to keep in mind that the baseline assessment is derived from a combination of the company's financials and the sector/country averages for the relevant products/value chain of each company assessed.

HOLISTIC TOOLS

The holistic tools' case studies provided a broad view of the sample portfolio's impacts with respect to the Sustainable Development Goals. The fact that the portfolio performed so poorly on environmental measures relative to the benchmark does not mean that investors should necessarily avoid the agri-food sector. As a broadly diversified investment fund's financial performance is generally explicitly compared to a mainstream broad benchmark, excluding significant sectors is unlikely to be practicable. However, the factors highlighted by the holistic tools provide avenues for fund managers to select better-performing names within the sector, according to whichever of the factors their clients may prefer. The summary below presents the strengths and limitations of the holistic tools as observed from the case studies.

STRENGTHS

- **Coverage:** Both tools had no issues with generating output for the sample portfolio as-is in the case studies.

- **Developers' transparency with respect to their methodologies:** The SIFN tool is constructed on CISL's open-source framework, and Impact Cubed has published several white papers that articulate its methodology in detail (see Impact Cubed 2018 & 2021 in the References section). This openness allows potential users to assess whether tools meet their specific needs, and also allows for opportunities for methodological improvement through feedback from third parties.

- **Ease of use:** Both tools are easy to use from an investor perspective, with the effort involved limited to uploading the relevant portfolio and benchmark data. The output is provided rapidly and involves data from sources that are already familiar to mainstream investors.

- **Accessibility:** The concepts they engage with are already broadly familiar to mainstream investors, and their pricing (a few thousand euros per fund assessed) is potentially accessible even to smaller investment firms.

LIMITATIONS

- **Limited coverage of environmental issues:** For both tools this was limited to metrics for water usage, waste generated and GHGs, with PIF also including business model metrics that determine to what extent portfolio constituents aggravate or contribute to solving environmental issues. This is primarily an issue of data availability and corporate disclosure.

- **Benchmark:** Since both holistic tools compare impacts relative to a benchmark, the results depend greatly on the benchmark chosen. This relative context needs to be highlighted when discussing a portfolio or fund's impact footprint – otherwise, it is easy to conceive of a situation where a benchmark with particularly negative impacts is chosen in order to make a portfolio look better than it actually is.

- **Data quality:** ESG data disclosure lacks standardisation, and takes place under a variety of reporting frameworks. What is reported varies by company, may involve significant levels of estimation, and in many cases is not audited. The holistic tool developers mitigate this to the extent possible by focusing on objectively measurable data points, and by subjecting the data to their own error checking models.

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RECOMMENDATIONS & MOVING FORWARD

The finance sector's journey into impact assessment/footprinting is only just beginning. The tools identified are in the early stages of development, and will only grow in depth, breadth, and maturity as companies and FIs discover and make use of them. This section aims to suggest action items that tool developers, FIs, regulators, and WWF can do currently, as well as what they should consider doing in the future.

4.1 RECOMMENDATIONS: TOOL DEVELOPERS

As impact measurement/footprinting at the portfolio level is a relatively new space, the tool developers should consider ways to harmonise and/or standardise the metrics and language they use to measure and present their outputs, to the extent this is practicable in a commercial or methodological context. Early alignment on terminology could help foster more rapid take-up by investors still learning about impact footprints.

Other areas to consider focusing their efforts include:

- The biodiversity tool developers can consider supporting the kind of research needed to expand the scope of the scientific databases they use – which would enable them to incorporate additional categories of assessment into their tools, such as marine biodiversity or the effects of plastic waste.

- The SDG-specific tool developers should support the development of expanded corporate data disclosure requirements that would facilitate the improvement of their products.

- The tool developers should work towards investor education and other demand-creation efforts, to support raising the profile of impact measurement in the mainstream finance sector. Collaborating with civil society organizations and think tanks can be helpful in this regard.

4.2 RECOMMENDATIONS: FINANCIAL INSTITUTIONS

As demonstrated in the case studies, these tools are usable by portfolio and fund managers now. As such, the primary recommendation for FIs is that they include these types of tools as they consider how to incorporate impact into their investment decision making process. The tools allow portfolio and fund managers to demonstrate quantitatively the validity of sustainability-related claims such as SDG alignment at the fund level and thus reduce vulnerability to accusations of "sustainability-washing." They can also be used in non-sustainability labelled funds and portfolios, to measure their absolute impact on biodiversity or the environment, or to compare their SDG footprints against a reference benchmark.

From a policy standpoint, rules like the EU's Sustainable Finance Disclosures Regulation (SFDR) with its "Principal Adverse Impact" disclosure language are coming into effect; the tools examined in this report may provide support for meeting or exceeding these requirements. FIs should also support the development of the expanded disclosure requirements necessary to enable a more robust and granular quantification of company-level impact along the various dimensions of sustainability.

Other potential use cases of these tools for portfolio investors include:

• Portfolio construction/rebalancing, sector tilts, sustainable product development

• Green/sustainability certification of investment products

• Peer comparisons

• Time series performance comparisons/progress updates

• Benchmark performance comparisons

• Prioritisation of key SDGs to contribute to

• Prioritisation of key environmental or social indicators to reduce impacts

• Identification of priority candidates for corporate engagements

• Company-level investment decision support

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4.3 RECOMMENDATIONS: REGULATORS & POLICY-MAKERS

The availability of impact measurement tools also has implications for regulators and policy-makers. As with FIs, different regions, countries and markets are at different stages in their integration of sustainability factors into their policy and regulatory frameworks. This report's primary recommendation to central banks and financial supervisors is for them to consider environmental impact measurement in addition to the current focus on environmental risk analysis in the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) (NGFS 2020).

In addition, regulators and policy-makers can:

• Support the development of the expanded disclosure requirements necessary to enable a more robust and granular quantification of company-level impact along the various dimensions of sustainability

• Use the impact tools to assess environmental impacts of their own portfolios, where relevant and feasible

• Use the impact tools to monitor claims of SDG- or ESG-aligned funds or biodiversity-themed funds

• Encourage FIs to use robust and credible impact assessment tools

• Encourage or require impact disclosure in financial products or more transparent disclosure of impact assessment methodologies in product-related documents

• Study the extent (if any) to which environmental and/or sustainability impact measurement results can be applied to capital requirements/risk weights, as some are doing with respect to certain types of ESG risk factors

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4.4 WWF'S ROLE

As part of WWF's engagements / conversations with portfolio managers, investors and other FIs, WWF will seek opportunities to introduce the topic of non-climate environmental impact measurement at the portfolio level. WWF can engage with portfolio investors to better understand their needs and preferences around investment impact measurement, and work to encourage and support their use of such tools.

WWF is one of the founding members of the Task Force on Nature-related Financial Disclosure (TNFD). As TNFD aims to provide a framework for corporates and financial institutions to assess, manage and report on their dependencies and impacts on nature, the tools and methodologies introduced in this report can guide the way forward for the impact measurement work. WWF was also a founder of the Natural Capital Coalition and is on the Advisory Panel of the Capitals Coalition, which unites the natural social and human capital coalitions. WWF will engage with regulators and policy-makers in the future to advise on the applications of these tools in implementing regulations related to sustainable finance disclosure and impact measurement.

WWF is also closely involved with the Science-Based Targets Network[6] (SBTN), which aims to guide companies and cities to set nature-related targets that are built on existing sustainability tools, approaches, and platforms. The first step of setting such targets is assessing a company's biggest

impacts and dependencies on nature and the environment. WWF will continue to influence the development of this work and help companies – and eventually financial institutions – set targets for nature.

WWF will contribute to developing the body of knowledge in this space through research. One area could involve filling data gaps with respect to biodiversity impact measurement. A recent Credit Suisse survey of investors highlighted the availability of data as the top barrier to investments supporting biodiversity (Credit Suisse 2021). In addition, WWF will contribute to developing impact metrics for biodiversity, to help companies and financial institutions better measure their impacts with quantitative metrics. WWF may also conduct research by using some of these footprint tools to assess the SDG impacts of SDG-themed indices, potentially in collaboration with mainstream index providers.

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[6] Science-based targets (SBTs) are measurable, actionable, and time-bound objectives, based on the best available science, that allow actors to align with Earth's limits and societal sustainability goals.

4.5 MOVING FORWARD

As the momentum for sustainable investing continues to grow, the need to filter out funds and investors that are built on ESG-washing and impact-washing will continue to increase. The rapid advancement of emerging impact measurement tools, as discussed in this report, will influence many of the important initiatives ahead, including TNFD, SBTN and the integration of sustainability into accounting frameworks.

When formally established, TNFD will be tasked with delivering a framework to guide nature-related financial disclosure by 2023, which will include impact assessments as well as risk and dependencies (TNFD 2021). When combined with sustainability-related targets for FIs – such as from the forthcoming SBTN guidance for FIs – it will become possible to determine the degree to which an investment portfolio is aligned with the planetary boundaries[7]. Until such time, the impact/footprint data from the tools will be a key input for FIs in their disclosure of impacts.

As more companies join the SBTN, investors will be able to utilize such targets to align their portfolios to the science-based targets for nature. Because understanding the impacts of financial portfolios is a key basis for target setting, FIs interested in the development of this initiative will need to pay attention to the rapid evolution of impact/footprint measurement tools.

Improved disclosure of impact/footprint data is likely to be incorporated into or enabled by the various non-financial accounting/valuation standards – such as ecological, natural capital, or broader sustainability standards – that are at varying stages of discussion and development. Some examples of these include the UN-adopted SEEA[8] Ecosystem Accounting methodology, the European Commission's Align and Transparent projects to standardise natural capital accounting and valuation approaches, and the Partnership for Biodiversity Accounting Financials, an international partnership initiated by the financial sector. In addition,

work led by the World Economic Forum together with the International Business Council is aiming to develop common metrics to mobilize consistent reporting of sustainable value creation, so that companies can align their mainstream reporting on performance against ESG indicators and track their contributions towards the SDGs on a consistent basis (WEF 2020). Finally, the Natural Capital Protocol is a decision-making framework that enables organisations to identify, measure and value their direct and indirect impacts and dependencies on natural capital; the Protocol's Finance Sector Supplement extends this framework to FIs across the entities and portfolios they finance, invest in, or underwrite.

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[7] See the Stockholm Resilience Centre for more details on the planetary boundaries concept.

[8] System of Environmental Economic Accounting

Box 2: Links to Relevant Multi-Stakeholder Initiatives

- **Task Force on Nature-related Financial Disclosure:** https://tnfd.info/
  > Aims to provide a framework on nature-related disclosures to shift finance from nature-negative to nature-positive.

- **Science-Based Targets Network:** https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf
  > Aims to equip companies and cities with the guidance to set science-based targets for climate and nature.

- **SEEA Ecosystem Accounting:** https://seea.un.org/ecosystem-accounting
  > An integrated and comprehensive statistical framework for organizing data about habitats and landscapes, measuring the ecosystem services, tracking changes in ecosystem assets, and linking this information to economic and other human activity. Adopted by the UN Statistical Commission in March 2021.

- **Natural Capital Protocol** and **Finance Sector Supplement:** https://capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=training_material
  > A framework that enables the identification, measurement and valuation of the direct and indirect impacts and dependencies on natural capital of a business or FI.

- **Align:** https://ec.europa.eu/environment/biodiversity/business/align/index_en.htm
  > Aims to support businesses, financial institutions and other stakeholders in developing standardised natural capital accounting practices, including a standardised approach to biodiversity measurement.

- **Transparent:** https://capitalscoalition.org/project/transparent/
  > Sister project of Align; leading the work on the non-biodiversity elements of natural capital.

- **Partnership for Biodiversity Accounting Financials:** https://www.pbafglobal.com/
  > Aims to develop a set of harmonized principles underlying biodiversity impact assessment.

ANNEX A: WWF IMPACT TOOL RESOURCE DATABASE

Figure 25: WWF Impact Tool Resource Database – Primary List

Name	Provider	Assessment Focus	Assessment Target	Impact Measurement Type	Ease of Use	Geo. Coverage	Sector Coverage
Corporate Biodiversity Footprint	Iceberg Data Lab	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated	Global	Pan-sectoral
Biodiversity Impact Analytics	CDC Biodiversité / Carbon4 Finance	Biodiversity-specific	Companies / Portfolio	Absolute	Fully automated	Global	Pan-sectoral
Biodiversity Footprint for Financial Institutions	ASN Bank / PRé / CREM	Biodiversity-specific	Bank Balance Sheet	Absolute	Partially automated	Global	Pan-sectoral
Net Environmental Contribution metric	Sycomore AM et al.	General E focus	Companies / Portfolio	Relative	Partially automated	Global	Pan-sectoral
Portfolio Impact Footprint	Impact Cubed	SDG	Investment Portfolio	Relative	Fully automated	Global	Pan-sectoral
Sustainable Investment Framework Navigator	KPMG / CISL	SDG	Investment Portfolio	Relative	Fully automated	Global	Pan-sectoral
Portfolio Impact Analysis Tool for Banks	UNEP FI Positive Impact Initiative	SDG	Bank Business Lines	Relative	Partially automated	Global	Pan-sectoral

Figure 26: WWF Impact Tool Resource Database – Honourable Mention

Name	Provider	Assessment Focus	Assessment Target	Impact Measurement Type	Ease of Use	Geo. Coverage	Sector Coverage	Comment
Global Biodiversity Score for FIs	CDC Biodiversité	Biodiversity-specific	Companies / Portfolio	Absolute	Partially automated	Global	Pan-sectoral	Service
NASDAQ ESG Footprint Tool	NASDAQ	ESG	Investment Fund	Relative	Fully automated	Global	Pan-sectoral	Service
GRESB Portfolio Analysis Tool	GRESB	ESG	Companies/ Projects	Relative	Fully automated	Global	Real Assets	Tool
GRESB Real Estate Assessment	GRESB	ESG	Companies/ Projects	Both	Manual	Global	Real Estate	Methodology / Framework
GRESB Infrastructure Assessment	GRESB	ESG	Companies/ Projects	Both	Manual	Global	Infrastructure	Methodology / Framework
Planet Tracker	Planet Tracker / Investor Watch	Other E-specific	n/a	n/a	Fully automated	National	<5 sectors	Exposure Attribution
Trase.finance	Global Canopy	Forest-specific	Companies	n/a	Fully automated	National (limited)	Deforestation	Exposure Attribution
Trase.earth	Global Canopy	Other E-specific	Companies	n/a	Fully automated	National (limited)	Soft commodities	Exposure Attribution
The GIIN Impact Toolkit	The GIIN	n/a	n/a	n/a	n/a	n/a	n/a	Database
Natural Capital Toolkit	SHIFT / Capitals Coalition	n/a	n/a	n/a	n/a	n/a	n/a	Database
Guide to classifying the impact of investments	Impact Management Project	all	n/a	n/a	Manual	n/a	n/a	Methodology / Framework
Impact Class Catalogue	Impact Management Project	Generic impact	Investment Fund	Other	Fully automated	Global	Pan-sectoral but limited participation	Database

ANNEX B: REFERENCES & TOOL DEVELOPER CONTACT

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PII: https://www.unepfi.org/positive-impact/unep-fi-impact-analysis-tools/portfolio-impact-tool/

IMPACT CUBED DISCLAIMER

IT'S TIME TO TURN TOWARDS THE IMPACT OF FINANCIAL PORTFOLIOS ON THE ENVIRONMENT AND SOCIETY, BECAUSE INVESTORS DESERVE TO KNOW WHAT IS TRULY SUSTAINABLE.

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