

Biodiversity & economy

SPECIAL EDITION

Promoting business  
**reporting standards**  
for **biodiversity** and  
**ecosystem services.**

The Biodiversity Accountability  
Framework (BAF)

October 2010

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Entreprises, territoires et environnement



## Environmental dynamics for the territories

Since 1992, the non-profit organization Orée brings companies and local authorities together so as to develop a joint reflection on their environmental impacts and, in particular, on environmental management and its practical implementation at the landscape level.

The spirit of the association is reflected in **its 7 priorities** :

- > Biodiversity and economy
- > Concerted consultation
- > Eco-design of products and services: Internet platform <http://ecoconception.oree.org>
- > Expertise
- > Sustainable management of business parks and industrial ecology
- > Environmental risks
- > Environmental awareness

## Orée's goal

DIFFERENT ADHERENTS	BROUGHT TOGETHER	TO WORK ON TRANSVERSAL THEMES	SHARING THE SAME ENGAGEMENT
<ul style="list-style-type: none"> <li>• Companies</li> <li>• Local authorities</li> <li>• Other institutions</li> <li>• Associations</li> <li>....</li> </ul>	In order to interact and share ideas, to create an environmental management, to search propositions ...	Biodiversity, industrial ecology, concerted consultation, eco-design, environmental awareness....	Orée's charter

## Orée's tools

### Member's services

- > Weekly newsletter
- > Working group
- > Debate meetings /BibliOrée / CinéOrée
- > Monthly press release
- > Monitoring

### Orée's publications

English :

- > "Integrating biodiversity into business strategies"
- > Special edition "Biodiversity and Climate"
- > Eco-design of products and services Platform <http://ecoconception.oree.org> (in English end of 2010)
- > Orée's quarterly "Letter" – Lettre Orée

- > Promoting business reporting standards for biodiversity and ecosystem services

French :

- > Le plan de déplacement inter-entreprises un outil de management de la mobilité sur les zones d'activités
- > Mettre en oeuvre une démarche d'écologie industrielle sur un parc d'activités
- > Guide sur les performances environnementales des pratiques de transport et de logistique
- > la relation clients fournisseurs
- > Kit de sensibilisation du personnel
- > Guide de management environnemental sur les parcs d'activités
- > Vade-Mecum de la concertation locale

# Foreword

## Michel Trommetter

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### Initial results of a joint project

In 2006, the French Institute of Biodiversity and Orée decided to create a working group on biodiversity and business strategies. Jacques Weber (director of IFB at that time, today FRB) and François Laurans (Veolia) were the co-chairs of this group while I was the IFB's coordinator.

The objective of the first meeting was for Orée members to share their definitions of biodiversity as well as their perceptions of business dependence on biodiversity. Based on dialogue between businesses and scientific community, this gathering was a success and gave rise to quarterly meetings.

The objectives of the working group were developed step by step: the purpose of the first step (2006-2008) was to show that there wasn't any private company totally independent of biodiversity, taking into account their environmental impacts as well as their current and future production processes; the second step (2008-2010) was to create a new accounting approach placing biodiversity at the heart of the business strategy; the third step will relate to the analysis of interactions between businesses and other stakeholders in relation to living systems (to be developed).

The first step resulted in the development of the Business & Biodiversity Interdependence Indicator. It was published in the Orée / FRB guide «Integrating biodiversity into business strategies», in which 25 Orée members (including 4 local authorities) agreed to publish their self assessments. This guide highlights their de-

pendence on living systems (ecosystem services, technologies, innovation), and has therefore encouraged us to take the approach further. This guide was also a springboard to promote our work at the international level, primarily via the European Platform for Biodiversity Research Strategy (EPBRS).

The second stage the second stage (Joël Houdet's Phd thesis financed by Veolia and the French State, supported by Orée) aimed at developing a new accounting approach, based on the analysis of input-output flows derived from biodiversity according to their degree of human-induced transformation. These flows are measured both economically and physically. Joël Houdet has developed and proposed a management accounting approach for taking into account the interactions between biodiversity and businesses, which is currently being tested by several companies (Veolia Environnement, LVMH, Inddigo), with other cases to be completed in the coming months (Séché Environnement, SAF – the French Agricultural Society, Solabia).

Even though Joël Houdet's PhD thesis is now completed, the activities of the working group continue. It is currently co-chaired by Mathieu Tolian (Veolia) and I. The work is still in progress on the accounting approach as well as on the analysis of the interactions between Orée members on the subject of biodiversity. I hope that the group ultimately achieves its objective, i.e. developing tools to formalize the links between stakeholders in relation to the living systems. You are welcome to help us achieve it.



Veolia Environnement is the world leader in environmental services. With operations on every continent and more than 312,590 employees, we provide customized solutions to meet the needs of municipal and industrial customers in four complementary segments:

- **water** (management of water and wastewater services for municipal and industrial clients, design/build of technological solutions and the public works necessary to deliver water and wastewater services),
- **environmental services** (environmental and flow logistics services, including cleaning, site remediation, pipe systems maintenance, collection, consolidation and transfer, for local authorities and businesses ; hazardous and non-hazardous waste sorting, treatment and recycling, composting, landfilling and physical-chemical treatment ; conversion of waste to energy, organic matter and recycled raw materials),
- **energy services** (provides energy and climate conditioning services ; heating and cooling networks ; industrial utilities ; integrated comprehensive building management services ; climate control and power equipment installations, industrial maintenance ; public lighting),
- **passenger transportation** (outsourced management of urban, regional and national public transit systems under public-private partnerships ; all types of vehicles, including buses, motor coaches, trains, metro systems, light rail, trolleys, ferries and taxis).

Global biodiversity is decreasing at an unprecedented rate. The operation of ecosystems and the quality of the services they provide humans are under threat. According to the United Nation's Millennium Ecosystems Assessment, more than 60% of ecosystems are reported to be in a degraded state. The United Nations has declared 2010 the "International Year of Biodiversity" to raise awareness among the international community of this serious threat. Within this context, Veolia Environnement is maintaining its commitment to:

- define precisely its impacts and dependency on ecosystems;
- act to preserve biodiversity and make wise use of "ecosystem services";
- inform, train and educate about the issues of biodiversity.

Boosted by the innovative nature of Orée's initiative, and aware of the associated risk, Veolia Environnement decided to commit to co-chairing the working group and provided financial support to Joël Houdet's PhD thesis. Besides, further to the publication of the guide "Integrating biodiversity into business strategies", Veolia Environnement was one of the first companies to launch, in 2009, a case study to put into practice the methodological elements developed by Joël Houdet as part of his thesis. This study, carried out in one of our facilities located south of Berlin, related to the interdependence of biodiversity and wastewater treatment. This study, not only provided Joël Houdet with additional elements for his thesis, but also opened up the field of the economic approach of ecosystem services for Veolia Environnement. This subject definitely represents a significant opportunity for the future of the company.

The results of Joël Houdet's thesis and of Orée's working group more than justify Veolia Environnement's investment. Additional developments are however necessary to achieve a Biodiversity Accountability Framework allowing companies to assess and monitor their relationships with biodiversity. Veolia Environnement, in partnership with Orée, intends to pursue this effort by encouraging the implementation of new case studies within companies and by supporting the continuation of academic work which will result in an operational and universally used tool.

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# Promoting business reporting standards for biodiversity and ecosystem services

## The Biodiversity Accountability Framework (BAF)

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### Executive summary

Civil society and the scientific community have been voicing their concerns about business-induced biodiversity loss for several decades. Yet, the business community has officially been asked to contribute to the objectives of the Convention on Biological Diversity (CDB) only in 2006, when decision VIII/17 was taken at CoP 8 in Curitiba. Innovative tools are needed for firms to thoroughly take biodiversity and ecosystem services (BES) into account within their decision-making processes and daily operations. As the International Year of Biodiversity unfolds and CoP 10 of the CDB draws near, the lack of standardized methodology to help them account for their BES dependencies and impacts to external stakeholders is increasingly recognized as a major barrier to widespread pro-biodiversity changes in business strategies and practices. The aim of this concise research report is twofold: (A) to present the main results of our work on BES accounting for management purposes, and (B) to raise awareness about the need for integrated financial - BES reporting standards.

### Recommended citation

Houdet, J., Trommetter, M., Weber, J., 2010. Promoting business reporting standards for biodiversity and ecosystem services. The Biodiversity Accountability Framework. Orée, 16 p.

Based on J. Houdet's PhD thesis "Businesses, biodiversity and ecosystem services: what interactions and strategies? What accounting information systems?" Under the supervision of Michel Trommetter, and as part of Orée's working group "Business & Biodiversity" co-Chaired by Jacques Weber, Michel Trommetter and Veolia Environnement.



With the support of



and FRB and the French Ministry for the Environment (MEEDDM)





## Acknowledgements

The author would like to gratefully acknowledge:

- Orée’s President, Ghislaine HIERSO, as well as the members of Orée’s executive board;
- The co-chairs of Orée’s “Biodiversity and economy” Working Group: and Mathieu TOLIAN (Veolia Environnement);
- Denis GASQUET (Veolia Environnement), Sylvie BENARD (LVMH), Nathalie FRASCARIA (Agro-ParisTech), and Jacques RICHARD (Université Paris-Dauphine) for their scientific or financial support.
- Fleur RODRIGUEZ† (Kenzo) and Gaël GONZALEZ (Orée) for their contributions to case studies on BES accounting for management purposes;
- Layla MATHIEU (Orée) for editing and proofreading.

## Keywords

Biodiversity Accountability Framework, business, organization, biodiversity, ecosystem services, integrated reporting, stakeholders, standards, management accounting, indicators, environmental performance

## List of abbreviations:

- AIS: Accounting Information Systems  
BAF: Biodiversity Accountability Framework  
BBII: Business and Biodiversity Interdependence Indicator  
BES: Biodiversity and Ecosystem Services  
CBD: Convention on Biological Diversity  
CSR: Corporate Social Responsibility  
EEFR: Extra-Financial Environmental Reporting  
EFA: Environmental Financial Accounting  
EMA: Environmental Management Accounting  
ES: Ecosystem Services  
EDS: Ecosystem Dis-Services  
FA: Financial Accounting  
GRI: Global Reporting Initiative  
IFRS: International Financial Reporting Standards

## INTRODUCTION

This work falls within Phase 2 of Orée's "Biodiversity and Economy" Working Group which was launched in early 2009: our aim was to develop new accounting methodologies to help firms (a) manage their interactions with biodiversity and ecosystems services (BES) and (b) report their performance to external stakeholders. This endeavor builds upon the results of Phase 1 which contributed to the increasing recognition worldwide that all business activities depend and impact to some degree on BES; notably through the publication of *"Integrating biodiversity into business strategies"* by Orée and FRB (Houdet 2008). This book was articulated on numerous case studies involving the Business and Biodiversity Interdependence Indicator (BBII). Besides, it underlined the need to develop an appropriate set of tools enabling firms to identify, quantify and manage their BES dependences and impacts, as well as report their BES performance to various stakeholders.

This report aims to make the case for international reporting standards on BES. To that end, we succinctly discuss:

- The potential uses of BES indicators;
- The main results of our work on BES accounting for management purposes;
- Alternative approaches for reporting BES performance;
- The need for integrated financial – BES reporting standards as well the key principles of a Biodiversity Accountability Framework.

## BES INDICATORS: IDENTIFYING BUSINESS NEEDS

Firms mobilize environmental data sets and indicators for a variety of purposes. Table 1 identifies common uses of environmental information within the scope of distinct, yet closely interacting business interfaces: the production system, the organizational system and the institutional system. Due to changes in public policies, increased stakeholder pressure or new pro-BES business opportunities, information about BES dependences and impacts are becoming increasingly valuable to business.

At this stage, BES indicators are used mainly for:

- The appraisal of new development projects involving environmental impact assessments and the design of mitigation measures;
- Innovative product life-cycle impact assessments (land-use, ecotoxicity), notably for food products (Jeanneret et al., 2008);
- Voluntary CSR reports disclosing information pertaining to biodiversity risks (e.g. proximity of fixed assets to protected areas and threatened species) and impact mitigation measures undertaken.

	Production system	Organizational system	Institutional system
Uses of environmental information	<ul style="list-style-type: none"> <li>- Tools, standards and indicators for production processes / routines and the management of assets.</li> <li>- Product design: life-cycle assessments</li> <li>- Project, capital investment, business model, technology appraisal: comparison of alternatives (cost-benefit analysis), environmental impacts assessments</li> </ul>	<p>Information systems enabling:</p> <ul style="list-style-type: none"> <li>- The coordination of environment-related activities within the firm (e.g. environmental management system)</li> <li>- The production of environmental performance reports to a variety of internal stakeholders.</li> </ul>	<p>Communication with external stakeholders :</p> <ul style="list-style-type: none"> <li>- Formal and informal stakeholder engagement</li> <li>- Voluntary (CSR reports) and regulated (financial reports) disclosure of environment-related information</li> </ul>

**Table 1** : The diversity of uses of environmental information within firms



For firms to take biodiversity and ecosystem services into consideration for decision-making, they need suitable tools to identify, measure and monitor their interactions with BES. While most BES tools, whether already available or in development, have been designed independently from business information systems – with the assumption that end-results could be readily used by firms, recent endeavors are focusing on integrating BES data sets and indicators within pre-existing business decision-making frameworks (governance, strategy, operations management), notably ISO standards, the Global Compact Performance Model and the GRI's G3 reporting framework (Waage et al., 2010). As argued by the TEEB for Business Report (van der Lugt et al., 2010, p. 5), *“the challenge is to establish reliable information management and accounting systems that can provide relevant information on BES to support operational decisions (e.g. the choice of production technology), to inform financial valuations or project assessments (e.g. capital investment), and for internal and external reporting”*. In other words, BES indicators may be needed to:

- *“Understand the **impacts** and **dependencies** of different **business models** on BES;*
- *Track **key performance indicators** that relate to strategic business goals and enable effective risk and opportunity management; and*
- *Communicate BES related **performance** and **challenges** to both **internal** and **external stakeholders**”* (van der Lugt et al., 2010, p. 5).

In early 2009, Orée's “Biodiversity and Economy” Working Group has opted to work on integrating BES into business accounting information systems (AIS). Though their degree of sophistication is highly variable (from simple cashbooks to high-end accounting software), AIS are used by all firms: they often constitute the key tool for effective communication between production, organizational and institutional systems. We further chose to follow two complimentary approaches, which reflected a widespread divide in the use of AIS:

**Work Stream A. BES accounting for internal stakeholders** (management purposes).

**Work Stream B. BES accounting for external stakeholders** (CSR purposes).

## **Work stream A: integrating bes into management accounting information systems**

For Work Stream A, we have explored how Environmental Management Accounting (EMA) could be expanded to include BES indicators. EMA is broadly defined to be the identification, collection, analysis and use of two types of information for internal decision making (UNSD 2001; Savage & Jasch, 2005), namely (a) monetary information on environment-related costs, earnings and savings and (b) physical information on the use, flows and destinies of energy, water and materials (including waste). EMA may be particularly valuable for internal management initiatives with a specific environmental focus, such as environmental management systems, product or service eco-design, cleaner production and supply chain management.

To reach our goal, several case studies have been launched in close partnership with firms (Kenzo - LVMH, INDDIGO, SAF, Séché Environnement, Solabia, Veolia Water). For instance, we have attempted to identify and quantify business interactions with BES at a wastewater treatment plant in Berlin (Gonzalez & Houdet, 2009)<sup>1</sup>. So far, these case studies demonstrate that it is possible:

1. To classify material input-output flows derived from biodiversity according to their degree of human-induced transformation<sup>2</sup> and to whether their use involves monetary inflows (revenues) or outflows (internal costs / expenses); hence providing a straightforward methodology for tracing and quantifying the dependence of organizations to biodiversity-derived materials. This further allows firms to define impact mitigation strategies tailored to each type of material: e.g. managing impacts associated with the extraction of non-renewable fossil resources versus managing those of production systems involving living organisms (farming activities).
2. To quantitatively assess the business benefits and damages derived from ES and EDS, that is quantifying business expenses and revenues arising from the ES trade-offs underpinning the business model. For instance, to satisfy contractual performance criteria, BWB (Berliner Wasser Betriebe) management is currently mainly concerned with (a) the management of ecosystem services derived from microorganisms

<sup>1</sup> This industrial facility belongs to Berliner Wasser Betriebe (BWB), a public water services company owned at 49.9% by the consortium RWE-Veolia Water.

<sup>2</sup> Houdet et al. (2009a, p. 11) have identified different categories of materials derived from biodiversity: living organisms, untransformed biological materials, transformed biological materials, materials derived from transformed biological but non-renewable fossil resources.



within its wastewater treatment plant, that of water purification<sup>3</sup> and sludge digestion<sup>4</sup> and (b) the quantity, content and delivery timing of wastewater entering WWTPs, which are influenced by various ES / EDS within urban areas upstream (Gonzalez & Houdet, 2009). Yet, to enable companies to fully quantify the trade-offs underpinning their business models, the precise spatiotemporal mapping of ES sources, delivery channels, modes of appropriation and beneficiaries would be required (Houdet et al., 2009a; Houdet 2010).

This work goes beyond the qualitative identification of ES impacted or used by the company. Because ES benefits are derived locally and vary according to users with often competing needs and land-uses (Ruhl et al., 2007), we need to highlight the importance of quantifying the species, functional groups and ecosystem processes which underpin the ES and EDS influencing production processes, cost control and revenue generation. By allowing business to understand which BES components it controls, promotes or suppresses, this ecosystem approach to EMA could become very useful for promoting pro-biodiversity business strategies and practices.

This may involve paying business for ES maintenance, delivery or restoration, provided contractual arrangements do not favor a single ES (e.g. CO<sub>2</sub> sequestration) at the expense of biodiversity and other less lucrative ES (Houdet et al., 2009b). In the case of BWB, the challenge amounts to changing the contractual terms underpinning a public - private partnership. Negotiations between the different stakeholders, notably the local public authority (Land of Berlin), might lead to:

- The incorporation of quantified BES performance targets within the contract;
- The prescription of pro-biodiversity tools and methods for the management of wastewater collection - treatment infrastructures and associated land assets;
- An investment program focused on the ecological restoration of waterways using ecological engineering techniques<sup>5</sup> contributing positively to both to biodiversity and water quality (Gonzalez & Houdet, 2009).

However, because of the voluntary nature of our EMA approach to BES accounting for internal stakeholders, complementary tools would be needed for firms to sys-

tematically take biodiversity into account within their corporate governance, decision-making and performance assessment processes: working on BES accounting for external stakeholders (Work Stream B) aims to address this challenge

### Work stream B: reporting bes dependences and impacts to external stakeholders

Environmental issues have become prominent Corporate Social Responsibility (CSR) issues for external stakeholders worldwide, including citizens, rating agencies, minority shareholders, investors, governmental and non-profit organizations and leaders. Often defined as the duty to take into account the ecological implications of the company's operations, products and facilities, corporate environmental responsibility is no longer a luxury but a requirement for many companies.

What would be the most appropriate approach for disclosing business performance regarding the management of BES dependences and impacts? Before presenting the key principles underpinning our proposed Biodiversity Accountability Framework, we discuss the aims and limitations of the main environmental reporting approaches.

### Comparing existing environmental reporting approaches

To date, three distinct environmental reporting approaches targeting external stakeholders have been identified (Houdet 2010):

1. Environmental Financial Accounting (EFA);
2. Disclosure of environmental externalities;
3. Extra-Financial Environmental Reporting (EEFR).

#### 1. Environmental Financial Accounting (EFA)

Contrary to management or cost accounting, Financial Accounting (FA) is highly regulated by national legislations, in increasing reference to the International Financial Reporting Standards (IFRS). FA aims to satisfy the

<sup>3</sup> 40% of total operating costs at Wassmannsdorf's plant.

<sup>4</sup> 60% of total operating costs are related to sludge management at Wassmannsdorf's plant, a significant share of which involves the digestion process.

<sup>5</sup> e.g. planting floating islands at a cost of approximately 65 €/m<sup>2</sup> (Albaric 2009).



information needs of external stakeholders (governmental agencies, financial authorities, shareholders) which need standardized and comparable information for assessing corporate financial performance.

EFA constitutes an extension of conventional FA: it aims to differentiate commercial, economic or legal events of an environmental nature which have a direct financial impact, present (expenses, sales) or future (long-term liabilities, provisions), on the reporting entity. To record the associated accounting journal entries one must satisfy the same accounting rules as for any other accounting event. EFA typically implies:

- Disclosing material environmental provisions and liabilities;
- Publishing synthetic reports of environmental expenses and revenues, either within annexes to the annual financial reports or within CSR reports; often classified by the type of action undertaken or environmental media (e.g. table 2).

YEAR	2007	2006	2005
Soil and water protection and treatment	1 123	786	457
Protection of ambient air and climate	1 468	686	555
Wastewater treatment	18	461	29
Waste management	49	17	1 346
Biodiversity and landscape protection	84	74	8
Other environmental activities	748	903	1 758
<b>Total (environmental media)</b>	<b>3 490</b>	<b>2 927</b>	<b>4 153</b>
Pollution prevention	554	1507	1 802
Measurement and control	1 649	806	314
Pre-treatment, treatment and disposal	13	481	13
Recycling and valorization	1 274	133	2024
<b>Total (type of action)</b>	<b>3 490</b>	<b>2 927</b>	<b>4 153</b>

**Table 2 :** Consolidated environmental expenses for Séché Environnement (in M€)

## 2. Disclosing environmental externalities

Although it provides some valuable data regarding environmental revenues and expenses, EFA has been criticized for two main reasons:

- It provides neither information nor proof (a) of the ecological effectiveness of the measures undertaken and (b) of the benefits supposedly arising to stakeholders.
- It cannot take into account the negative environmental externalities of the reporting entity because these externalities do not satisfy the recognition criteria for recording liabilities: they imply sacrifices of future economic benefits to other agents the company is not required to make.

As a result, many have advocated the disclosure of environmental externalities within financial statements (Milne 1996; Richard 2009). The 1990 environmental report of BSO / Origin provides a good illustration of what may be done to that end (Huizing & Dekker, 1992). Quantitative environmental accounts (atmospheric emissions - CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, solid waste, wastewater) were converted into monetary values via economic valuation tools. This allowed BSO / Origin to disclose a *net added-value*, representing the difference between conventional *value-added* and *value-lost*; the latter amounting to the costs of BSO / Origin externalities less its impact mitigation expenses (table 3).

Though this reporting approach seems appealing and may spur lively debates with stakeholders, one may question its practical implications. No money outflow from the reporting entity has occurred. BSO / Origin's value lost is merely the result of a calculation with no contractual party identified for the various externalities at stake: it could be argued to amount to a *symbolic debt to nature* (Houdet et al., 2009a). Besides, there would be significant limitations to expanding this disclosure approach to BES externalities. One can mention the lack of reliable estimates due to a combination of factors, including (a) methodological challenges (ES quantification and mapping), (b) controversies with respect to the underlying assumptions of valuation techniques used (discount rate, sample representativeness, neutrality of questions asked) and (c) prohibitive costs of undertaking appropriate spatiotemporal assessments (Chevassus-au-Louis et al., 2009). As argued by O'Connor et al. (2001), financially quantifying all business environmental externalities is impossible due to a *monetization frontier*: i.e. the variation in our capacity to put monetary values on non-marketed ecosystem functions and services according to the importance or scale of the issue at stake and the type of values involved (e.g. existence values of biodiversity).

		In million Dutch guilders
1	<b>Value added</b>	<b>255,614</b>
2	<b>Value lost (3-4)</b>	<b>1,993</b>
3	Costs of externalities	2,209
4	Impact mitigation expenses	0,216
5	<b>Net value added (1-2)</b>	<b>253,621</b>

**Table 3 :** Calculation of net value added for BSO / Origin in 1990 (Huizing & Dekker, 1992)

### 3. Environmental Extra-Financial Reporting (EEFR)

Developed independently from AIS and financial accounting standards, environmental extra-financial reporting (EEFR) has become popular with firms wanting to satisfy the ever-increasing demand of external stakeholders for information regarding their environmental performance. This is probably due, at least partially, to the aforementioned limitations of both environmental financial accounting and the disclosure of negative externalities.

EEFA involves reporting corporate performance with respect to the management of environmental issues, usually through annual CSR reports. According to ISO 14031, a standard which describes processes and methods for measuring environmental performance, three main types of environmental indicators may be used by firms to that end: indicators of business-induced environmental change (e.g. Pressure-State-Response framework), process-based indicators (e.g. degree of implementation of environmental management system) and results-based indicators (e.g. eco-efficiency indicators<sup>6</sup>). Usually, businesses use a limited number of Key Performance Indicators to communicate with external stakeholders, such as annual changes in resource use efficiency (e.g. water consumption per unit of goods sold) or in global air emissions (e.g. greenhouse gas).

The GRI provides to authoritative standard for firms wanting to produce CSR reports. In terms of biodiversity, it recommends the use of a concise set of indicators pertaining to:

- (a) The presence of remarkable biodiversity elements (e.g. threatened, rare or protected species, protected areas) on or in close proximity to land assets owned or leased by the reporting entity;
- (b) Business impacts on biodiversity and
- (c) Measures undertaken to mitigate these impacts.

From a similar perspective, Michaël Jones provides a precise EEFR framework dedicated to accounting for the biodiversity (habitats, species) present on land assets owned by firms (figure 1): it falls within the « direct accountability (and thus measurability) of an organization's stewardship of its wildlife resources » (Jones 1996, p. 248).

Though this EEFR approach provides some useful guidelines with respect to reporting biodiversity risks, impacts and mitigation measures to external stakeholders, its implementation presents a number of limitations in terms of both the content and scope of disclosed information:

- Business reporting practices are far from consistent: data selection is often arbitrary (e.g. inadequate impact assessments in countries with poor regulatory capacity), probably due to a combination of factors including the lack of both (a) consensual indicators (especially for BES; van der Lugt et al., 2010) and (b) sanctions against deceitful or undisclosed information.
- The disclosure of biodiversity impacts and mitigation measures is essentially limited to new projects which require environmental impact assessments: reporting entities often discard ongoing impacts of previously-authorized operations, and, more importantly, largely ignore the BES impacts of supply chains owing to an alleged lack of control and influence on the practices of their suppliers and clients.
- EEFR has no direct link with financial statements and performance so that it fails to promote the business case for biodiversity. More specifically, it does not account for the contributions that BES make to the business model and, hence, it is neither possible (a) to assess the financial impacts of BES dependencies nor (b) to quantify how the reporting entity contributes to the sustainable use of BES and the equitable sharing of the benefits derived from the latter (Houdet et al., 2009; Houdet 2010).

<sup>6</sup> The concept of eco-efficiency links monetary and physical EMA for decision making in a systematic manner. An eco-efficiency indicator relates "product or service value", in terms of turnover or profit, to "environmental influence" in terms of energy, materials and water consumption, as well as waste and emission in terms of volumes (Verfaillie & Bidwell, 2000).



Figure 1 : hierarchical criticality of natural inventories for environmental reporting (Jones 1996, p. 291)



### Promoting integrated financial - BES reporting standards: the Biodiversity Accountability Framework

The closing section of this report aims to concisely present the key principles of a Biodiversity Accountability Framework (BAF); a BES reporting framework which could fall within a broader integrated reporting framework, as advocated by the International Integrated Reporting Committee (IIRC)<sup>7</sup>.

For many years authors have emphasized the importance of non-financial compliance with standards defined outside of reporting entities (Gray et al., 1987; Hui-zing & Dekker 1992; Milne 1996; Richard 2009): this is because they may be legitimately used as “yardsticks” to judge their environmental performance. As the International Year of Biodiversity unfolds and CoP 10 of the CDB draws near, the timing could not be better to promote the

need for business reporting standards regarding BES.

Given the limitations of the three aforementioned approaches to environmental reporting, Houdet (2010) argues for the development of an integrated financial – BES reporting framework, one which would combine the best of financial accounting, EFA and EEFR. In other words, by differentiating accounting journal entries according to their links with BES, the BAF aims to provide the data needed by organizations to report both (a) their financial dependence to BES and (b) their impacts on BES (Houdet et al., 2009a; Houdet 2010). This would imply an ecosystem approach to accounting and reporting, going beyond the assets directly-controlled by the reporting entity: i.e. towards accounting for its interactions with BES throughout the ecosystems within which it operates directly (legal control over land assets) or indirectly via its supply chains (land assets of its suppliers).

<sup>7</sup> “The IIRC’s remit is to create a globally accepted framework for accounting for sustainability: a framework which brings together financial, environmental, social and governance information in a clear, concise, consistent and comparable format - put briefly, in an “integrated” format. The intention is to help with the development of more comprehensive and comprehensible information about an organization’s total performance, prospective as well as retrospective, to meet the needs of the emerging, more sustainable, global economic model.”  
<http://www.integratedreporting.org>

### *Reporting the financial dependence of the reporting entity to BES*

**Methodological principle:** to quantify (a) the various ecosystem inputs-outputs (e.g. material flows derived from biodiversity) and (b) modes of appropriation of ES (e.g. intensity of land-use) associated with assets, liabilities, expenses or revenues.

**Aim:** to produce key performance indicators (quantitative and qualitative) pertaining to:

- (a) The share of revenues contingent to material flows derived from biodiversity and / or different modes of ES appropriation: i.e. spatiotemporal characterization of the ES trade-offs underpinning the business model;
- (b) The degree of financial dependence of the reporting entity to BES: e.g. consumption of ecosystem material flows per type of asset, liability, revenue or expense;
- (c) The sharing of ES benefits with stakeholders across the supply chains: e.g. share of value-added appropriated by the local communities involved in production processes per unit of goods sold.

### *Reporting impacts and the ecological efficiency of mitigation measures*

**Methodological principle:** to regularly assess and report the status and trends of remarkable / critical biodiversity elements (e.g. rare species and habitats) and ecosystem services used by other agents (e.g. water delivery timing and quality of downstream users) impacted by all routine and exceptional business activities (i.e. disclosing the assets, liabilities, revenues and expenses influencing BES), whether through directly-controlled assets or via supply chains. Geographical information systems would be required so as to produce contextual data sets reflecting actual ecosystem dynamics.

**Aim:** to produce key performance indicators (quantitative and qualitative) pertaining to:

- (a) The trends in BES used and impacted by production processes;
- (b) The key threats and impacts linked to business activities: e.g. disclosure of the location of land assets involved in production processes, disclosure of the actual land footprints of material consumptions (wood, water, food);

- (c) The actions undertaken to mitigate impacts on all land assets controlled directly (e.g. costs by type of action);
- (d) The actions undertaken to mitigate the impacts of supply chains;
- (e) The ecological efficiency of mitigation measures undertaken: i.e. reporting changes in targeted BES (indicators of ecosystem health and resilience).



## CONCLUDING REMARKS :

This report presents our recent work on BES accounting for both internal and external stakeholders of organizations. After explaining the principles of BES accounting for management purposes, we have compared the three major environmental reporting frameworks targeting external stakeholders. This led us to highlight the need for integrated financial reports combining financial and BES data sets. Indeed, developing integrated financial - BES reporting standards would provide many benefits, including:

- Supporting the information needs of long-term investors, by showing the broader and longer-term consequences of decision-making;
- Reflecting the interactions between ecological, social, governance and financial factors in decisions that affect long-term performance and condition, making the links clear between ecosystem trends and financial performance;
- Providing the necessary framework for BES factors to be taken into account systematically in reporting and decision-making;
- Rebalancing performance metrics away from an undue emphasis on short-term financial performance;
- Providing the data needed to rate organizational performance with respect to the management of BES dependences and impacts.

Yet, several major challenges would need to be addressed before making the Biodiversity Accountability Framework fully operational, including:

- Developing suitable accounting information systems (software);
- Setting up tools for ongoing monitoring of business-induced BES dynamics over space and time, in partnership with NGOs, research institutes/networks and public institutions;
- Developing tools for the efficient tracing of interactions throughout supply chains;
- Lobbying for the institutionalization of financing mechanisms (e.g. ecological fiscal reform) so as to make the ensuing changes in accounting and business production practices financially viable.



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# FRENCH FOUNDATION FOR RESEARCH ON Biodiversity

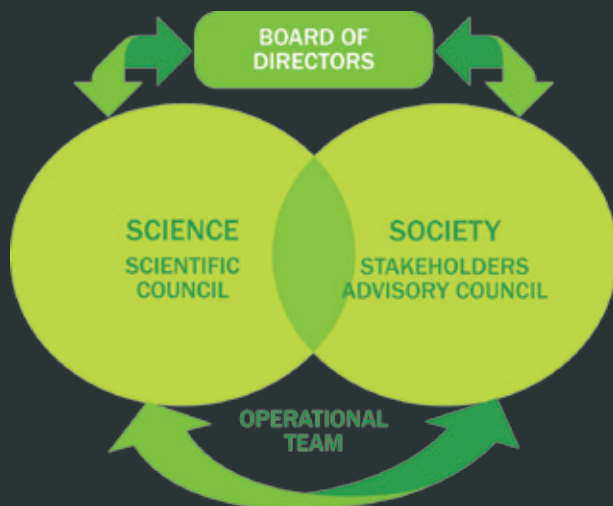
A SCIENCE-SOCIETY INTERFACE  
TO ADDRESS THE SCIENTIFIC CHALLENGES IN BIODIVERSITY



## ➔ A FOUNDATION FOR SCIENTIFIC COOPERATION ON BIODIVERSITY

- To gather French public research institutes
- To identify research priorities
- To coordinate, promote and support research on biodiversity

## ➔ AN INTERFACE BETWEEN RESEARCH AND SOCIETY



## ➔ FOUR APPROACHES BASED ON CO-CONSTRUCTION AND MULTIDISCIPLINARITY

- ➊ **ENHANCE DIALOGUE AND MOBILISE STAKEHOLDERS OF BIODIVERSITY**  
To map and develop the French scientific expertise
- ➋ **PROMOTE SYNTHETIC AND STRATEGIC ACTIVITIES**  
To identify knowledge and key issues for future
- ➌ **SUPPORT AN INTERDISCIPLINARY AND MULTI-STAKEHOLDER APPROACH TO RESEARCH**  
To support ambitious and unifying programs
- ➍ **DISSEMINATE KNOWLEDGE AND ENHANCE THE STANDING OF FRENCH RESEARCH**  
To inform public and policy makers

“The national database of researchers in biodiversity, access and benefit sharing, center for synthesis and meta-analysis in biodiversity, mechanism to mobilize French expertise, indicators, Build scenarios to predict biodiversity dynamics, network of European research on biodiversity : BiodivERsA, values...”

