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INTRODUCTION

In 1979, René Passet published a groundbreaking work on environmental economics, “*L'économique et le vivant*”, in which he represented the world as composed of three concentric spheres: the *ecosphere* or economic sphere, the *sociosphere* or social sphere and the *biosphere* or living world, which encompasses the other two. These spheres, says Passet, are not autonomous: matter, energy and information are exchanged between them. This representation of the world, though schematic, is extremely interesting as an illustration of the interdependence of the economy and society with the biosphere. Passet's conception has the additional merit of presenting the biosphere as a whole, which fits with the current scientific understanding of biodiversity.

Up until 2005, the year of the Paris Conference on “Biodiversity, Science and Governance”, it was common to hear people say that biodiversity was too complicated an issue for businesses to get involved with, except perhaps as sponsors of some environmental initiatives lead by non-governmental organisations. It was different from the issue of climate change, for which an accounting unit was available, the tonne of carbon. Biodiversity was seen as an exogenous constraint, to be addressed by helping preserve some charismatic species, which would in return be beneficial to the company's reputation.

A lot has changed since 2005!

The *Millennium ecosystem assessment* (MEA), published in May 2005, has had a considerable impact, especially in proposing a shared logical framework for analysing ecosystems and developing a typology of “ecosystem services”, those services humans derive free of charge from the functioning of ecosystems: the regulation

of water and air, the supply of goods, medicines, food, fibres and other materials, as well as religious and cultural aspects of our relationship with living systems. The ensuing challenge is to take them into account towards sustainable development.

A conference at the Elysée Palace in February 2007, arranged by President Jacques Chirac, assigned the same degree of priority to biodiversity and climate change on the international political agenda and envisaged the need for reform of the ways in which economic activity worldwide is regulated. A proposal was made to create a global ecological organisation for this purpose, which would co-ordinate all UN agencies' policies.

The Stern Report, published in 2006, assessed the economic consequences of inaction with respect to climate change by the year 2050 and created quite a stir.

In 2008, the European Commission, building upon the MEA, undertook a similar project to assess the costs of inaction if the 2010 target of halting the erosion of biodiversity is not met (*which we know it will not be...*). The group in charge of this project has released an interim report with instructive preliminary results for businesses. Its initial results, although expected to evolve, are fraught with significance: the **degradation of ecological services** may represent as much as **7% of world GDP in 2050** or 13,938 billion Euros a year.

Accordingly, reconciling economic activity with biodiversity calls for a twofold initiative: **encouraging businesses to take action** and **developing new tools for them to do so**. “*Integrating biodiversity into business strategies*” is designed to meet this dual need.

METHODOLOGY

The “Business and Biodiversity Initiative”, supported by the European Commission, was launched in 2005 by the Secretariat of the Convention on Biological Diversity (CBD). This initiative organises regular meetings on this theme and calls for adopting best practices so as to minimise ecological damages and conserve biodiversity. Decision IX/26, taken in Bonn at the Conference of the Parties 9 of the CBD in 2008, has emphasised the importance of engaging business in achieving the aims of the convention.

Risk analysis with respect to the loss of biodiversity and ecosystem services (BES) has led to the development of various tools, notably the methodologies proposed by the MEA (2005) and the World Resources Institute in its ESR report (2008). Variability and uncertainty associated with BES are both sources of *risks* and *opportunities*, for instance in terms of supply of raw materials, reputation, access to / cost of capital, and regulations. So as to ensure the viability of businesses, these methodologies help rank issues for decision-making and action, towards better impact management; with the underlying aim of integrating biodiversity into the economy, by putting an appropriate price on it.

The Working Group behind this book belongs within the context of the “Business and Biodiversity Initiative”, but has its own particular point of view: the ambition is that its work will **go beyond the search for a compromise** between biodiversity conservation and economic growth to incorporate biodiversity fully into business strategies, using the **language of business** itself, that of *costs* and *profits*. Ways must be found through which biodiversity can drive development while economic activity can be a means to conserving or increasing biodiversity. This may seem utopian, but it is an appropriate framework for strategic thinking.

In late 2005, the Institut français de la biodiversité (IFB) and *Orée* – Entreprises, Territoires et Environnement began to discuss the possibility of creating a Working Group on biodiversity which would bring together businesses and scientists as well as non-profit organisations and local governments. It was soon agreed that the Group could undertake a two-stage project:

Stage 1: identifying and evaluating the dependence of businesses on living systems. How much of their raw materials comes from living systems? How much of the technology they use? Beyond that, is it possible to estimate the percentage of sales due to biodiversity? If so, how should we evaluate the *contribution of biodiversity* in terms of a *business’s revenues and expenses*?

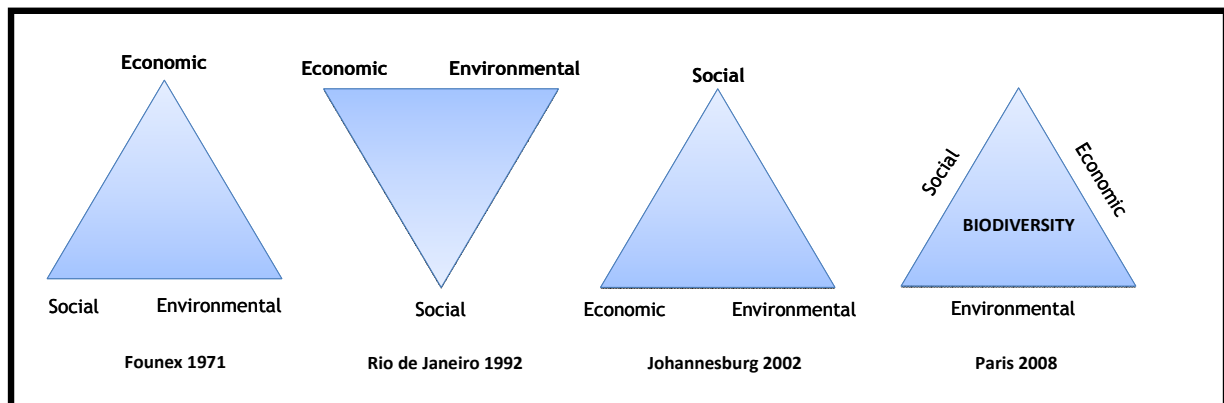
Stage 2: how can we integrate biodiversity into business strategies? If stage one confirmed the vital importance of biodiversity for businesses, their profits and their future, then an exclusive focus on reducing the impacts of business on biodiversity should be discarded in favour of an *innovative approach* in which *biodiversity becomes an integral part of business strategy*.

The challenge, largely sketched out but not yet fully realised at this stage, is to build a ***Biodiversity Accountability Framework***, which would be the *biodiversity equivalent of the “Bilan Carbone”* (methodology for greenhouse gas accounting). Financial accounting is not designed to assess and monitor relations between business and biodiversity: this requires the kind of innovation outlined here, to be developed more fully in Joël Houdet’s PhD thesis, co-financed by CREED - Veolia Environnement and ANRT.

Has the IFB-*Orée* Working Group’s gamble succeeded? That is up to the readers, and especially the business members of the Working Group, to decide.

In the research community, it has certainly proved a success, as illustrated by the endorsement of the work by the Fondation française pour la recherche sur la

biodiversité (FRB). To signal its institutional continuity with the Institut français de la biodiversité, the FRB has asked that its logo appear on the book.



The evolution of the hierarchy of issues, from Founex to Paris. Biodiversity underpins the interactions between social, economic and environmental issues.

KEY FINDINGS

Biodiversity as insurance policy

Interaction is the keyword of life.

We must interact to co-operate, to procreate, to change the environment in which we evolve and to adapt to the natural evolution of that environment. In the same way, interaction with the entire living world is vital for us: we eat nothing but living organisms - vegetables, fruit, meat - and we co-operate with living organisms to obtain other products, such as those which require fermentation - beer, wine, cheese and bread, among others. Our buildings are largely composed of material derived from living systems. Fossil fuels and limestone are also inherited from the biodiversity of past eras, as is the very air we breathe.

Biodiversity can be viewed as a **storehouse of responses which living systems can make when faced with ecosystem change**, including climate change. If the store is reduced due to the pressures of human activity, this will inevitably create a mismatch between the variability of the environment and the range of possible responses by biodiversity, to which humans belong. We only view a snapshot image of the diversity of living systems, so that we are tempted to identify many species and habitats as redundant or inessential. But it is crucial to take account of time scales for an understanding of the importance (a) of each component of biodiversity and, especially, (b) of their interactions.

We could take the operations of an investment bank as a parallel: the creation of diversified equity portfolios, that is, portfolios consisting of a variety of stocks which perform independently on the stock exchange, is designed to reduce the risks associated with the market in general and with the specific characteristics of each stock. The same holds true for the relations between humans and ecosystems. To rely solely on one type of land use which appears to be optimal at a given point in

time, but which irreversibly degrades ecosystems by homogenising their biological components, amounts to a particularly risky gamble which threatens our future. That is why we view biodiversity in all its *variety, complexity* and *variability* as **insurance against the unexpected** in the context of global ecosystem change, whether “natural” or anthropogenic.

Economic sectors' direct dependence on living systems

The Working Group initially sought to identify the ways by which biodiversity plays a role in shaping business strategies. In the first meetings in 2006, a starting-point and a **common vocabulary** were defined. It allowed us to get our first sense of what each member thinks about biodiversity so that to assess its interconnections with business. We found that companies view biodiversity as:

- A going concern issue,
- A source of raw materials, technologies and products,
- A source of profits,
- Linked to private production costs,
- Linked to social costs in terms of possible damages to ecosystems.

The Working Group developed a methodology for **categorising the various industries**, using the classification of French industries on the INSEE website, in terms of their degree of **direct dependence on living systems**. An industry is understood as a group of homogeneous production units which manufacture products or provide services belonging to the same type of economic activity as defined by INSEE. The method used was designed to be simple so as to make businesses aware of the issues and initiate a process of participatory research.

For its analysis of the *direct links* between industries and the living systems they depend on, the Working Group adopted four evaluation criteria:

- The **raw materials** derived from living systems to be used in the manufacture of goods and / or provision of services in the industry in question, such as cotton for the clothing industry;
- The **technology** derived from biodiversity to be used in the industry in question for the manufacture of goods and / or provision of services, such as lactic fermentation for yoghurt and yeast (alcohol) fermentation for bread;
- The **impacts** on biological diversity resulting from the industry's activities, such as habitat destruction;
- The **share of sales** related to biodiversity.

Through this initial research the IFB-Orée Working Group confirmed that **many industries are directly dependent to a considerable degree on living systems.**

The economy as a whole interacts with biodiversity

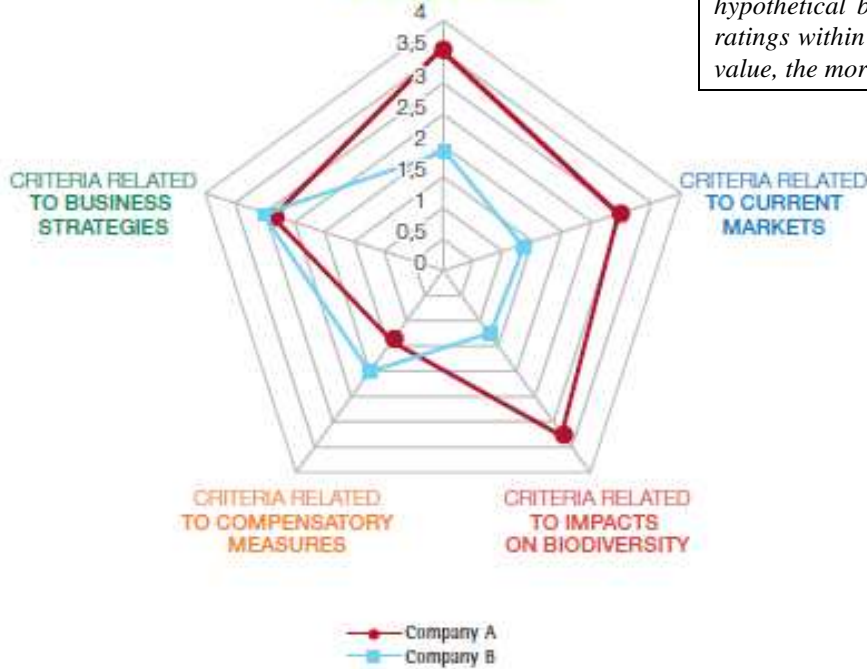
Understanding that the viability of the biosphere is a prerequisite for their own viability, member organisations of the Working Group sought to better understand their role in the dynamics of ecosystems. For this reason, the ***Business and Biodiversity Interdependence Indicator*** (BBII) was developed in 2006. As a self-evaluation tool, the BBII allows companies to identify their *direct* and *indirect interactions* with *living systems*. The aims were to help businesses (a) understand thoroughly the concept of biodiversity, (b) position themselves with respect to certain criteria selected as those which are the most informative and (c) set the basis for strategic decision-making.

Since June 2007, numerous interviews bearing on the *Business and Biodiversity Interdependence Indicator* (BBII) have been conducted with various organisations, including *businesses, business associations* and *local governments*. Interviewees were asked to rate 23 criteria with an integer ranging from 1 (not concerned by this criterion) to 4 (strongly concerned by this criterion). Adding an explanation to each rating was meant to give a qualitative sense of each interviewee's understanding of the interdependence of his organisation with biodiversity.

This work has confirmed that *biodiversity underpins the development of numerous businesses*. The **self-assessment reports** compiled in this book present the **perceptions that 25 organisations have of their own interdependence with biodiversity**. They have come to realise that the economy as a whole interacts, directly and indirectly, with living systems. Their interactions with biodiversity:

- Take place, *explicitly or otherwise, on a number of levels*, from industrial sites to surrounding areas, from the local to the international level, from production units to company headquarters, and from subsidiaries to parent organisations;
- Concern *numerous functions and skills* within organisations, from innovation to production cost control, from accounting to taxation issues, from management of social pressures to business or supply strategies, and from public relations to training of employees.

CRITERIA DIRECTLY RELATED TO LIVING SYSTEMS



A comparison of pentagrams of results for the BBII from two hypothetical businesses. Each axis represents the average of the ratings within the group of corresponding criteria. The higher the value, the more important is the group of criteria for the company.

Recent research shows that diversity and variability are the true insurance policies for the success of life on our planet, for they underpin the (free of charge) ecosystem services our economy rests on. *Industrialisation today simplifies and impoverishes ecosystems: production choices and processes homogenise biological diversity.* Technical, organisational and institutional **innovation** is elevating **biological uniformity** to the **status** of an **absolute, universal model.**

Businesses and all other economic agents, including consumers and governments, hence **share the responsibility for the global homogenisation of living systems.** How should we rethink the dynamics of interaction between businesses and living systems which now contribute to the increasing erosion of biodiversity?

The homogenisation of the living world in development and consumption choices

We are *witnesses* and *participants* in the **co-evolution** of *ecosystems* and *socio-economic systems*. Some species, those which provide us with direct economic or cultural benefits, have been actively selected by humans for millennia; monocultures and livestock farms are examples. These organisms have adapted to our selective pressure and in turn influence our choices and ways of life. This has led to the *competitive exclusion* of a myriad other species over increasingly wide areas. The overt or unconscious motivation for this selective co-evolution seems to be the *necessary control* of the *unforeseen*, of the *variability* and *complexity* characteristic of ecosystems and biodiversity, in order to produce more, live better and thus meet our needs of development. But this quest for absolute control, for optimising the transformation of raw materials derived from the living world, depends on **social choices** and is based on **value systems**.

Reintegrating economic activity into biodiversity

From an economic point of view, three main approaches have been proposed for taking biodiversity into account when making development choices.

1- *Asking how to integrate biodiversity into the economic sphere leads to putting a price on nature.* One seeks to represent the sum of willingness-to-pay as a strong case for action, comparable to market transactions between sellers and buyers. This would be like confusing the *price* that someone agrees to pay for the Mona Lisa with the *value* of the masterpiece, this without considering the costs necessary to its maintenance in the long term. What price can we put on the bacteria which digest the food in our intestines, the poppies and skylarks in our fields, or the parasites

which cause malaria? It is a safe bet that the price would vary from person to person, and would depend on the moment the question is raised. Surveys would have to be carefully set up and orientated! Which population would you choose? A group composed of members of various environmental NGOs? An audience made aware of the challenges posed by malaria on the occasion of the next World Health Day? Households affected by the recent stock market crash?

2- **Comparing different development scenarios** by way of a **cost-benefit analysis** may turn out to be more effective. When New York City began to plan the construction of a new water treatment plant, it did not attempt to put a price on nature. Instead, it estimated the **cost to restore the ecological functions** of its degraded watersheds, which proved to be very much cheaper than the construction and operation of the proposed plant.

3- Lastly, Nicholas Stern proposed a novel approach in his 2006 report on the economics of climate change: *separately* calculating the **costs of climate change** and the **costs resulting from the failure to act**. When decision-makers believe that some action or change of behaviour is expensive, they can often be made to change their minds by a demonstration of what it would cost *not to act* or *not to make a decision*. The team led by Pavan Sukhdev is now adopting this approach (TEEB, 2008), so as to compare the *economic benefits of biodiversity* with the *costs* associated with *its erosion*, the *costs of inaction* and, lastly, the *costs of its conservation*. For example, trying to estimate the economic and social costs of deforestation of the Amazon rainforest amounts to asking *how much it would cost to reconstitute this “lung” of the biosphere in all its complexity*.

It is commonly supposed that *biodiversity can be sustained by putting a price on it*. In reality this is a **counterproductive approach**. This is allegedly achieved via off-market assessment techniques which have serious

methodological limitations, for instance contingent valuation methods in which protocols cannot be replicated or results compared either geographically or temporally. In spite of the best efforts of economists, biodiversity is essentially irreducible to the categories of “goods”, “services” and “capital”. Ecosystems underpin economic activity (energy, organic and inorganic matter consumption) and our ways of life (climate and landscape variability, both living and non-living resources), which in turn affect ecosystems, their dynamics and the evolution of their living components. Cultural and biological diversity cohabit and coevolve within one single world-wide living system, the biosphere. We must acknowledge that biodiversity is our first insurance policy in an uncertain world, where changes and surprises in ecosystems are the norm. We need to *move away* from the approach in which it is *biodiversity that needs to be integrated into the economy*, towards the **reintegration of economy activity into the diversity of life**, into living - hence diversified - ecosystems.

Why is climate change so important? Because it determines the continuance of human life on Earth. But the evolution human life is equally shaped by biodiversity, whose erosion is due primarily to human activity and relatively very little to climate change, which itself is the result of human activity. The situation is urgent, and we need to shorten the time that was needed for the institutionalisation of climate change issues in order to reconcile economic activity with biodiversity. The goal is **to stimulate economic agents, with businesses in the forefront**, to work actively on **creating new methods, tools, products and services “to team up with life”**, in the words of Robert Barbault.

Beyond the arbitrary opposition between competitiveness and ecology

The *consequences of environmental policies* on **business competitiveness** depend in part on the specifics of each situation, economic sector or business, from the type of pro-environment efforts initiated to the length of the period of asset engagement. *Cost-benefit analyses* are used to justify or refute them. Their results are directly and indirectly influenced by:

- The **type of pro-environment efforts** undertaken: preventive actions (eco-design) cost less than corrective actions which require expensive investment to offset damages;
- The **length of the period of asset engagement**: a highly specific production unit would impose a significant loss to its holder if socially contested and closed by a government agency;
- The **modes of regulation, incentives and property rights** in force: if sources of pollution fall under clearly established property rights, it is socially optimal to make the polluter pay. Similarly, if a premium is put on deforestation combined with the growing of export crops, it is understandable that refraining from exploiting a tropical forest so as to convert it to a monoculture is equivalent to the incurring of an opportunity cost for the business in question.

To think of a **viable model of development** over the long term amounts to envisaging the improved management of the interactions between the various sources of variability, both natural and social, based on very long-term goals. We need to move on from assessing sustainable exploitation levels and work on understanding the dynamics of the interactions between resources and their users.

The management of “natural resources” is not the same thing as that of renewable resources such as biodiversity, water or the atmosphere. Sustaining a mining activity, for example, really amounts to postponing the eventual

exhaustion of the mine. For biodiversity, as for any other renewable resource, the problem is: what **mode of co-ordination** is possible among the users, given the *dual requirement* of the **viability of the resource** and the **profitability of the operations**? Accordingly, the cost-benefit analyses to take account of biodiversity within business strategies are closely related to *access, use and property rights*.

To address the management of resources in terms of land rights can lead to confusion between ownership of the land itself and of the rights to the resources it contains. A variety of property rights exist, from the traditional (private and public property rights) to the more complex (rights of access and use). For any elements of biodiversity which possess market value, squandering, excessive exploitation and overinvestment will occur if access is not restricted and controlled. A **primary goal** is the **elimination of situations of free access to resources**, regardless of the regime of property rights in place. Businesses have a fundamental role to play to that end, both at the level of the *land they own and exploit* and that of the *ecosystems from which they derive ecosystem services*.

Regimes of property rights must be precisely defined and cannot be reduced to private property or state property. In effect, private property cannot guarantee the viability of renewable resources. It is liable to lead to their wanton destruction, especially if capital is mobile. The **second goal for businesses** is thus to give themselves the means to produce positive externalities at both local and global levels: they need to **participate actively** in the development of **efficient and socially equitable management systems**, on a scale appropriate to every socio-ecological issue at hand. By eschewing any strategy devised merely to circumvent problems or costs, this would lead to technological, organisational and institutional innovations fostering the appropriate local management of ecosystems, without causing irreversible consequences at a global scale.

The related **modes of appropriation** by businesses could be evaluated via complementary criteria: (1) perceptions, (2) alternative uses of resources, (3) ways of accessing and controlling access to resources, (4) ways of transferring resources and profits derived from these resources, though not exclusively in monetary terms, (5) ways of allocating or sharing resources and / or the products derived from them. Companies would thus be required to understand the *ecological and social consequences* of:

- Each of the *property rights* (access, use, resource, land) relative to biodiversity which they own or control;
- Each of their *business and appropriation strategies* associated with living systems.

Goods and services for the co-viability of biodiversity and businesses

We seek a new model for the co-evolution of businesses and ecosystems, and we call it the **co-viability of biodiversity and businesses**. We propose to *overturn the uniformity model* and to build together a new model of development based on the growth and globalisation of the diversity of living systems. The aim is to reintegrate human beings, businesses and the global economy into the diversity of living systems. *For each product, service or economic activity*, this involves:

- Asking how we can guarantee the viability of biodiversity through the direct and indirect relationships between businesses and living systems, without compromising businesses' financial viability; in other words, how can we make *profit* an instrument for the *diversification of the living world* while making *biodiversity* a *source of increased profits*?
- Enhancing via *technological, organisational and institutional innovation* the “**biological roulettes**” which underpin the evolutionary dynamics of all living systems in the biosphere which human

beings depend on and form part of. Businesses need to go beyond avoiding, reducing or compensating for inevitable environmental damage. Once interdependence with biodiversity is an accepted and valued principle, we can move from a *system of external constraints* based purely on national or international public policy or regulations to a *system* in which “*teaming up with life*” means *choosing its diversity and its virtues* in the (models of) production of goods and services;

- Adopting an **ecosystem-based conception of value-added creation** through industrial processes, economic dynamics and modes of regulation, transcending national and legal boundaries and focusing directly on access to resources, their uses and modes of appropriation.

The foundations of the co-viability of biodiversity and businesses have been laid. Its success will depend on how it plays out in individual businesses and also within networks of companies, incorporated into decision-making tools. We need to foster the needed technological and organisational innovations towards *making biodiversity a land management and production standard*. Yet, how are we to guide the socio-economic systems, which now promote biological homogenisation, towards this new goal? How are we to understand precisely, both in quantitative and qualitative terms, the interaction dynamics between businesses and biodiversity?

Thinking in terms of interdependence with biodiversity produces two outcomes. In the case of “strong” interdependence, a business’s impacts on biodiversity cease to be an external constraint on its activity, which can consider it as a normal cost, offset by normal profits: it becomes an integral part of the business’s standard operations. Looking at the *costs* and *benefits* associated with the *reintegration of the economy into biodiversity* then becomes a *normal way of doing business*. This situation also calls for the introduction of a **new accounting system**, complementing the existing framework, which takes account of the relations between business and living systems.

Environmental financial accounting has been developed on the basis of accrual accounting. It focuses on actual or probable transactions of an “environmental” type, that is, those with a direct financial impact on the business. Probable transactions have to do with expenditures contingent on uncertain future events, such as the remediation of polluted sites, the management and disposal of hazardous materials, the management of time-limited facilities whose renewal requires

authorisation, or liability for products which have reached their end-of-life. Identifying and categorising these transactions can be done in various ways in order to guide action plans and decision-making. We may speak of different types of income and internal costs. However, costs “external” to the business are not included in such an accounting system. These include environmental damage for which a company is not financially responsible, often because there is a legal vacuum or no clearly established property rights. Businesses thus concurrently develop accounting systems for their consumption of materials, substances and energy, and for their production of effluents, emissions and waste. This non-monetary accounting provides data for the indicators used to draw up corporate social responsibility (CSR) reports. The aim is to control and reduce the negative environmental externalities of company operations.

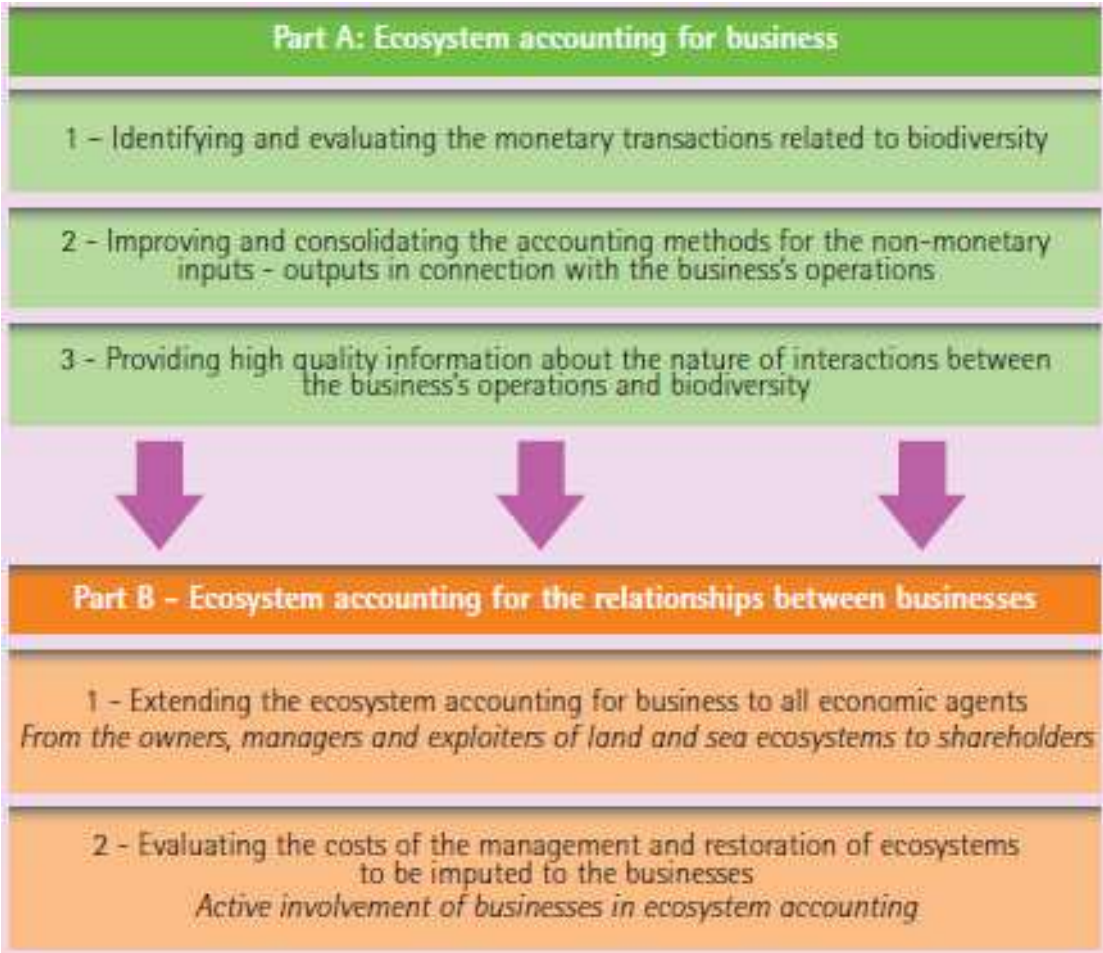
Our work belongs within this context. The methodology of the “Bilan Carbone” measures the amount of greenhouse gases emitted by all the physical processes required to sustain specific human activities or organisations, insofar as their boundaries are clearly definable. However, it does not, and is not designed to take account of the interactions between living systems and the world of business. To assist businesses to reduce the rate of erosion of biodiversity by 2010, we propose a practical instrument to account for their relations with living systems, after presenting the underlying principles of the technical, organisational and institutional innovations necessary for the co-viability of biodiversity and businesses. This is the ***Biodiversity Accountability Framework***, an interdisciplinary *accounting system* structured to highlight and delimit the *responsibility of organisations to ecosystems*. It aims to introduce consistency into the proliferation of initiatives, often contradictory and split up by industry sector, in order to take socio-ecological issues into account. Although it can be

adapted to all organisations - businesses, administrations, local authorities and non-profit organisations - our focus here is on businesses. The *Biodiversity Accountability Framework* falls into two inseparable parts:

Part A - Ecosystem accounting for business;

Part B - Ecosystem accounting for the relationships between businesses.

The stages of the Biodiversity Accountability Framework



The proposed *Biodiversity Accountability Framework* provides tools for concrete action. It is an accounting system which establishes links between (a) *businesses and biodiversity* and (b) *groups of businesses relative to the diversity of living systems*. Its purpose is to provide economic agents with the data needed to invest in:

- on the one hand, projects which aim at reducing the rate of ecosystem change, including climate change, so that they do not become irreversible;
- on the other hand, projects which would allow us to respond and / or adapt to these same changes.

The challenge lies *in convincing all the stakeholders of its relevance* and the *need for its institutionalisation*, that is, to overcome the resistance due to the economic and social costs of introducing this new form of accounting. What guarantees or insurance against the possibility of failure would a business have if it makes a commitment to ecosystem accounting within the meaning of the *Biodiversity Accountability Framework*? This is a legitimate question, for the very viability of some businesses could be compromised in the short term.

Towards a taxation system based on all consumption of nature

The stages of transition to dynamics of co-viability with biodiversity over the long term will need to be managed in the best possible way, both individually and collectively, by all economic agents. The time frame is a key consideration for the necessary changes to be financially profitable. Economic time, the time needed to modify behaviours and the time needed for the hoped-for feedback to occur within an ecosystem do not take place on the same scale, hence the need for *public support policies*. Accounting and fiscal instruments will need to be developed, suited to the viability constraints of businesses, to

complement the existing range of tools - and those now being finetuned - for promoting the viability of the diversity of living systems.

According to Dahle Oystein, former vice-president of Exxon's Norwegian subsidiary, "*Socialism collapsed because it did not allow the market to tell the economic truth. Capitalism may collapse because it does not allow the market to tell the ecological truth.*" A technical or institutional innovation may be profitable for a business (or a community) in the long term, but there is often no guarantee that it will be so in the short term. The rational risk-taking individual, the Schumpeterian entrepreneur, is as laden with guarantees as the Senegalese fisherman is with talismans. For the fisherman, debt, financial or moral, lies at the heart of social ties and takes the place of insurance, whereas a business is totally dependent on the world of global finance, which controls, finances and insures it against risk. The world of business, including that of global finance, is also particularly sensitive to the rules - both incentives and disincentives - which govern markets. As long as biodiversity has no economic "value" and there is *no cost*, at least apparently and in the short term, associated with *its destruction* and *homogenisation*, businesses will have a hard time finding rationality in the urgency to integrate their business strategies and operations into the diversity of living systems. We will not resolve this as long as our overall conception of the tax system excludes biological diversity. **Institutions, incentives and disincentives** are needed to make **implementation of the Biodiversity Accountability Framework profitable, along supply chains at each step of value-added creation**, from the extraction, harvesting or production of raw materials up to the sale and end-of-life of goods and services.

The *Millennium ecosystem assessment* identifies four types of capital: manufacturing capital, social capital, human capital and natural capital. At present the

bulk of taxation world-wide is applied to manufacturing capital and human capital (through labour). The MEA's experts argue that the present environmental crisis is in large part due to this type of regulation, which encourages the belief that natural resources and ecological services are free. They consider it necessary to plan, starting now, *to replace the taxation of manufacturing and human capital with the taxation of all consumption of nature*. This switch would act as a strong incentive to protect nature and increase employment. Since 1988 Sweden has made a commitment to the gradual introduction of ecological taxes *in place of existing taxes, leaving the total tax burden unchanged*. A worldwide switch may seem unrealistic, given that it would have to be discussed and co-ordinated globally, but it would be one of the surest ways to encourage economic activity in a direction conducive both to biodiversity conservation and to sustainable development. Indeed, socio-ecological trends, as well as the current worldwide financial crisis, call for **major changes in modes of regulation**.

CONCLUSION

The findings of the IFB-Orée Working Group, supported by Fondation française pour la recherche sur la biodiversité (FRB) and Veolia Environnement, have confirmed that biodiversity underpins the development of numerous businesses. The self-assessment reports compiled in this book using the *Business and Biodiversity Interdependence Indicator* (BBII) present the perceptions that 25 organisations have of their own interdependence with biodiversity. They have come to realise that the economy as a whole interacts, directly and indirectly, with living systems.

Technological, organisational and institutional innovation is elevating biological uniformity to the status of an absolute, universal model. Businesses and all other economic agents, including consumers and governments, share the responsibility for the global homogenisation of living systems. Yet, the failure of Biosphere 2, a recent experiment which cost approximately 200 million US dollars and covered an area of only 1.27 hectares, underscores our inability to create a viable artificial ecosystem in which we could live sustainably. *The homogenisation of biodiversity truly amounts to social and economic suicide.*

We need to move away from the approach in which it is biodiversity that needs to be integrated into the economy, by seeking to put an appropriate price on it, towards the reintegration of economy activity into the diversity of the living world. We propose a new model for the co-evolution of businesses and ecosystems, and we call it the co-viability of biodiversity and businesses. Based on the language of business itself, that of costs and revenues, this model calls for the introduction of a new accounting system, complementing financial accounting. The *Biodiversity Accountability framework* would account for the relations between businesses and living systems. It would allow us to revisit both *corporate* and *national accounting systems* as well as the

performance and development indicators that rely on them.

Faced with the **actual financial crisis** (*and an imminent global recession*), if we do not develop an *ecosystemic approach to the performance evaluation of organisations, goods and services*, we risk the return of unviable economic models so that “economic growth” resumes. Yet, what type of growth are we talking about? What type of growth do we want? On the basis of investments homogenising biodiversity, these models could be profitable in the short-term for their instigators. By playing with a diversified portfolio of risk mitigation tools aiming at moving away from a “real” economy in close interdependence with biodiversity, *global finance would not support their socio-ecological costs*, at least *immediately*. These costs, with potentially irreversible consequences, would be passed on to *future generations; those who will work tomorrow, save money for their retirement and children, borrow money to do business and invest*; all in close relationship with financial institutions.

Within the context of a call for a **new “Bretton Woods”**, we must make sure that this will not happen: this crisis is a major opportunity for the integration of the economy into biodiversity. The time has come to change modes of regulation and launch partnerships and constructive projects for the co-viability of biodiversity and businesses. Future research could focus on modelling ecosystem accounting for a business, a local government or a specific industry. This would help to identify the levers of action to be used to convince all economic entities, consumers and citizens, academia and governments, to become involved in **implementing ecosystem accounting for relations between organisations**. How substantial the return on investment will be if the gamble on the co-viability of biodiversity and businesses is a success!