Upscaling
Corporate Solutions
for **Biodiversity**

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Chairman's message

The scientific community has long warned us about biodiversity loss and recent events have in fact confirmed the associated risks. All stakeholders are now called on to factor nature into their ecological transition. A number of companies have been doing so for a long time, and even those who have a more indirect relationship with nature are now taking steps in that direction.

Albeit necessary, these initial steps are not sufficient to address the magnitude of the challenge. We now urgently need to scale up such actions, which presents two challenges. The first is the lack of a universal measurement tool that would make it relatively straightforward to factor the issue into economic decision-making, such as 'tonne of carbon equivalent' for climate issues.
Accordingly, developing multiple biodiversity indicators is widely seen as indispensable and intrinsic to addressing biodiversity issues.

The second challenge is even more vital. Since the Industrial Revolution, economic development has leveraged standardisation and mass production to reduce costs. Safeguarding biodiversity, however, requires sustaining highly diverse and variable local conditions, which involves re-engineering industrial processes in order to adapt them to local contexts. How do we reconcile such diametrically differing approaches, and perhaps even turn natural diversity into a development asset? Moreover, how do we achieve this at the required scale and pace?

This publication provides examples to illustrate how EpE members in all sectors factor in these challenges and implement replicable solutions. Aware of the urgent need to stop the current deterioration, we hope this paper will help companies achieve the necessary scale-up and foster a broader discussion with other stakeholders on the practices we must develop together.

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Chairman of EpE
CEO of BNP Paribas

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INTRODUCTION

"Biodiversity is essential to human existence and forms the backbone of our economy. If it were to disappear, so would business. This is now clear and reasonably-minded businesses cannot continue with a system that is disconnected from biodiversity-related issues."

Gilles Bœuf, December 2018

Strong societal expectations about nature conservation, international events for raising awareness among leaders in 2020-2021 (UNGA Nature Summit, World Conservation Congress, COP15 of the Convention on Biological Diversity, etc.), animal-based epidemics linked to growing human pressure on natural ecosystems[1], and indisputable scientific findings on the collapse of biodiversity[2] have led businesses over the last few years to include nature more decisively in their corporate social responsibility (CSR) strategies.

Corporates have also become aware of the consequences and risks to them of potentially serious or systemic biodiversity erosion, be they unrelated or indirectly related to their own ecological footprint. In this respect, the Covid-19 epidemic is the first overwhelming, global proof that nature-related risks[3] are real.

Despite strong signals and genuine growing awareness, demonstrated by the fact that biodiversity policy is now presented to the Board of Directors and is even discussed in general meetings, biodiversity is so far treated as a mere CSR issue, unlike climate issues, which have become a driving force of corporate strategy at many companies.

The causes for this are multiple, partly because biodiversity issues are complex to address, extremely varied across different territories, and difficult to factor into an economic model. They still seem remote to many companies, in the same way as most of us are hard pressed to link our daily actions to biodiversity erosion.

Moreover, since the issues are raised by environmental associations and public authorities rather than customers or shareholders, businesses tend to react to them somewhat defensively. There are technical reasons too. In the absence of a measurement tool equivalent to a tonne of CO_2, the factoring in of biodiversity issues by business is more complex than that of climate issues.

Yet many pilot achievements exist, as illustrated by the work of the EpE Biodiversity Commission, sustainable development reports, and other resources[4].The new challenge facing companies is how to scale up their actions and transform them into general practices or even business strategies, given that they originate in, and owe their success to, favourable local contexts, special circumstances or to the work of highly committed teams.

While some sectors (quarries, linear infrastructure, industrial sites) have proven expertise in dealing with long-standing regulatory constraints, others find themselves struggling with new and far-reaching issues, such as sustainable use of forests, ecological ecosystem management, wildlife conservation, and funding for scientific research. As living beings cannot be managed like tonnes of carbon, biodiversity issues are multi-faceted and local.

This is why, after working on biodiversity measurement tools and then the management of businesses' impacts on their value chain[5], since 2017 EpE members have been actively sharing and assessing their actions to "scale up corporate biodiversity solutions".

1 https://www.fondationbiodiversite.fr/wp-content/uploads/2020/05/Mobilisation-FRB-Covid-19-15-05-2020-1.pdf
2 IPBES assessment.
3 http://www.epe-asso.org/construire-une-relance-durable-juillet-2020/
4 See in particular https://ec.europa.eu/environment/biodiversity/business/index_en.htm and http://entreprises-biodiversite.fr/
5 http://www.epe-asso.org/en/companies-and-biodiversity-managing-impacts-on-the-value-chain-march-2017/

One of the first products of this approach was the creation and launch in 2018 of the multi-stakeholder alliance act4nature[6]. It was born from one observation: the biodiversity is more comprehensively and actively when the chief executive is personally involved and committed to it, thus conferring legitimacy on actions at every level of the company. The goal of act4nature was therefore to accelerate personal commitment to this issue at the highest level of management, so that all members of the company factored it into all their decisions. In the two years since launch, the experience of members engaged in this initiative confirms that corporate action in this field has become more systematic, structured and ambitious.

The EpE Biodiversity Commission and the act4nature Steering Committee have also identified and analysed in detail scale-up conditions in a number of studies, and used the findings to define the common commitments that form the basis of the act4nature initiative.

This publication shares the thinking of EpE members from all sectors of the economy based on their practical experience as well as discussions with experts and stakeholders with a view to facilitating the dissemination and application of solutions already implemented by them on a significant scale. It identifies the actions under way and seeks to define the conditions for their scale-up. The point is how to take or pursue actions of a similar nature at different plants and sites, or in other sectors and businesses, without switching pressure from one environment or issue to another?

Our purpose is to discover which initiatives work with what types of support, as well as the role of voluntary actions, regulations, scientific research, and consumers. This paper seeks to describe the actual levers and modes of action that are successfully being used by business. The challenge is a real one as the business models of big corporates are largely based on the use of natural resources - the core elements of which are land, air, water and even plants and animals - and thus on the transformation of common or appropriable environments and ecosystems. The question is how do we exploit and respect nature at the same time?

METHODOLOGICAL PROPOSALS

This publication does not claim to be a new report on biodiversity. The findings on biodiversity erosion factors and the actions undertaken are too numerous and conclusive for another building block[7] to be of any use.

Our compilation of examples is designed to focus thinking on material conditions allowing actions, once tested by economic stakeholders to promote biodiversity protection and restoration rolled out on a large enough scale to form an effective solution. The word 'solution' is taken to mean an institutionalised[8] practice that can mitigate the current global problem of biodiversity erosion. Businesses have the innovation capabilities, technologies, skills, and resources to mainstream the positive actions they have tested, and to adapt them to local contexts. Since such an alliance between a given practice and actual diversity in the field is a complex organizational, cultural and economic challenge, the search for solutions must also be backed and fast-tracked by public policy.

As will be seen from the examples we give, biodiversity is far too complex a subject to be reduced to a single and simple business case. The Business for Nature global coalition has identified, on a dedicated platform[9], 1,240 business action case studies on nature, including many initiatives to combat climate change, conserve water resources, manage waste and protect ecosystems.

Few ecosystem-related activities can be directly duplicated on a large scale or even replicated because of a number of obstacles, primarily physical (the same activity has highly variable impacts on nature depending on where it is located), but also cultural and organizational. These include:

- the complexity of biodiversity-related subjects,
- varying degrees of awareness among managers and employees,
- lack of legitimacy of local actions, which are not given wide enough recognition and often go unnoticed,
- vocational teaching that ignores or has ignored biodiversity,
- lack of external partners offering expertise or help to make the most suitable choices,
- slowness of biodiversity-friendly national and international regulations,
- behavioural inertia among individuals who are still unaware of the indirect links between their activities and nature[10], or how they can make positive contributions.

6 http://www.act4nature.com/en/history/
7 Refer to the general bibliography at the end of the publication.
8 H.S. Becker, Rendre la sociologie pertinente pour la société, Sociologies [online], Débats, La situation actuelle de la sociologie, http://journals.openedition.org/sociologies/3961
9 http://shift.tools/contributors/573?contributor_list_id=67
10 See also: H. Soubelet et J.-F. Silvain, Sauvons la biodiversité ! Les 10 actions pour (ré)agir !, Rustica, 2019.

There are also a number of economic and financial obstacles, such as:

- impacts that are difficult to quantify or analyse, be it the overall biodiversity footprint of a company or that of individual decisions, which are often partly positive and partly negative,
- absence of 'biodiversity' lines in accounts,
- difficulty in tracking or realising expected biological returns on investments,
- lack of valuation of ecosystem services rendered,
- ensuing lack of sustainable human and financial resources dedicated to biodiversity.

Yet, the scale-up of biodiversity-friendly corporate actions is well under way among many EpE members, with management and resources dedicated to overcoming or circumventing those obstacles and matching issue specifics with scale-up ambitions.

For example, RTE has addressed these challenges by converting rights-of-way under its power lines into ecological corridors. The project involves a host of employees, suppliers, and external stakeholders, a form of land-use valuation based on ecological quality, overall accounting of the new economic balance achieved, and lastly changes to the standard procedures governing relations with landowners and land managers, including loggers and farmers.

AN EXPRESSED NEED FOR METHOD

Biodiversity is local, complex, heterogeneous and relative. Applying existing actions to other sites and sectors is often undermined by the absence of a biodiversity-appropriate method.

There is a widely expressed and widely shared need for a method, with several initiatives designed to adapt proven business management methods to that need. For example, Natural Capital Protocol teams recently added a biodiversity supplement to better factor this specificity into their natural capital model[11]. Also, the Carbon Disclosure Project and the Global Reporting Initiative are seeking to standardise biodiversity reporting, based on the view that measurement tools can become management tools.

The originality of EpE's work lies in drawing on business experience without preconceived ideas about the methodological outcome of this approach or its goals. Instead of trying to fit nature into a framework defined by the world of business, our focus is on understanding what existing achievements mean or suggest.

To this end, we have opted for a method to assess innovation maturity and dissemination and adapted it to biodiversity.

SCALE-UP AND INNOVATION MATURITY

The term "scale up" migrated from technology to sustainable development a few years ago. It was popularised in particular by Peter Bakker, WBCSD President, who, since the Rio+20[12] conference in 2012, has been insisting on the need to apply the quantitative and qualitative methods used in business to deliver sustainable development benefits. The WBCSD approach is one in which a "*science-based approach and targeted business solutions aim to scale up business impact*[13]".

The scaling up of biodiversity action may be approached in the same way as the rollout of an innovation. This analogy calls for a closer look at the technology readiness level (TRL) method. Technology Readiness Level (or "technological maturity level") is used to assess the maturity level of a technology with a view to financing its development and integration into an operational system or subsystem and business model. The TRL rating, first used by US government agencies such as NASA, has since been widely shared and adopted by many organizations, businesses, and public institutions around the world. For example, it is a key component of the European Commission's Horizon-2020 research funding programme.

The rating provides information on a technology's proximity to the market and assesses whether the technology is still at the formulation stage of the principles on which the technology is based, or whether it has been tested, for example at pilot plants. Ranked from 1 to 9, TRL evaluates the maturity of a technology, its basic principles and its development from a prototype, a pilot, and an industrial demonstrator to its large-scale rollout based on a proven business model.

11 https://naturalcapitalcoalition.org/natural-capital-protocol/
12 https://www.theguardian.com/sustainable-business/rio-20-business-sustainable-development
13 https://www.wbcsd.org/Overview/Our-approach

Similarly, the French Treasury department uses a matrix to assess funding for Fasep-Innovation Verte (Green Innovation) projects[14]:

Scenario 1 : Demonstrators can be immediately duplicated. In this case, the first reference offered by the demonstrator aims for replication at the same level or on a larger scale, based on an immediate domino effect.

Scenario 2 : Pilots call for a prior context change before duplication. In this case, the first reference offered by the demonstrator is only the first step before a hoped-for deployment on a larger scale, which implies a context change (change in regulatory framework, maturity level of market, etc.). Context change is a prerequisite for the medium- and long-term spinoff prospects of the demonstrator.

For biodiversity issues, the second scenario is the most usual. Because local contexts vary greatly, rarely is a business able to simply replicate its biodiversity-friendly actions.

We use the two scenarios to assess the maturity level of solutions delivered by corporate biodiversity conservation and restoration actions. The result is a biodiversity-specific maturity scale (Biodiversity Readiness Level, BRL) designed to assess and categorise the 50 biodiversity activities reported in this paper.

Businesses sharing their varied solutions, as described in this publication, have wondered about:

1. What conclusions, societal challenges and pressures on biodiversity does the action address? (BRL 1)
2. What is the level of expertise of employees and management undertaking the action on biodiversity issues? (BRL 2)
3. What is the context and origin of the action (bottom-up initiative, top-down initiative, regulatory compliance, voluntary commitment, etc.)? (BRL 3)
4. What were the local impacts of the action's first implementation? (BRL 4)
5. What are the success factors for duplicating the action without rebound effects or pressure transfers? (BRL 5)
6. How sustainable is the solution's management and economic viability? (BRL 6)
7. What are the preconditions for applying the solution to other plants (or products) and then to other sectors? Are consumers and shareholders ready? (BRL 7)
8. How can we change business models - indeed consumption patterns - in order to include the action into our strategy? (BRL 8)

The last three steps appear to be the most critical and difficult for businesses to take, as will be seen when we examine the feedback.

We hope readers will take on board the solutions outlined in this publication and assess their level of maturity as well as the potential impacts of implementation. It should be borne in mind, however, that this biodiversity maturity scale needs to be further tested if it is to be applied as a method to scale up corporate biodiversity actions.

The consistent or blanket implementation of a successful action somewhere does not necessarily amount to scaling up. Similarly, there is no guarantee that biodiversity will improve or deteriorate if a given solution is widely applied. The effects of innovations cannot be predicted prior to their implementation at different levels.

The corporate actions described in the 60 boxes set out below therefore require very careful consideration.

This publication is divided into three chapters and draws on existing knowledge of the links between business and biodiversity loss.

Chapter 1 describes the **mechanisms to avoid or reduce the pressures** on biodiversity exerted by business, as listed in the IPBES summary report. These pressures are well known and measurable, even though their impacts vary depending on the sensitivity of the environments in which they occur. Stopping biodiversity erosion starts with reducing all such pressures. This is the first step of effective corporate action.

14 https://www.tresor.economie.gouv.fr/Institutionnel/Niveau3/Pages/3e2ffe3f-2575-4ab8-8427-db9fb7fa7fa8/files/b5ddd1c0-a30e-4411-b897-c36aa5afca63

Chapter 2 presents solutions for **recreating biodiversity-friendly spaces and conditions**. This involves safeguarding areas where nature can spontaneously thrive, and from time to time stimulating or stepping up its dynamics. The solutions are profoundly different according to the environments in which they are implemented. IUCN recommendations list three area categories for action: wilderness areas to be protected, productive areas to be exploited in a more biodiversity-friendly manner, and artificialised areas where nature is to be reintroduced.

The third and last chapter deals with management methods and tools **to promote the factoring of nature into economic decision-making**. It draws in particular on the biodiversity management analysis supporting the act4nature initiative.

CHAPTER 1

Reducing pressures

Biodiversity is undergoing rapid and partially irreversible erosion, a challenge as formidable as that of climate change[15]. This deterioration is due to human activities and, more particularly, to development and consumption patterns which create diverse pressures on ecosystems, spaces and species.

The first Global Assessment Report on Biodiversity and Ecosystem Services published by IPBES in May 2019 contains an accurate and quantified analysis of those pressures. This 1,700-page scientific report[16] does not identify any positive trend, or even stabilisation, anywhere in the world.
Biodiversity is deteriorating everywhere and very quickly. There is some protection of species and spaces, but not on a regional scale. Between 2010 and 2015, 6.5 million hectares of natural forest were wiped off the map each year (which is more than the size of the United Kingdom), while 35% of natural wetlands disappeared between 1970 and 2015. Bleaching now affects more than 30% of corals, and 60% of vertebrate populations have disappeared since 1970[17].

The five major causes of deterioration have been identified globally. Each stakeholder concerned about the issue can therefore analyse their footprint and organise their priorities for action in the following areas:

1/ land-use change and habitat loss,
2/ resource over-exploitation,
3/ climate change,
4/ pollution,
5/ invasive species.

This hierarchy may be different from one country to another. The 2009 Chevassus-au-Louis report, for instance, ranks France in the following order: 4, 1, 3, 2, 5[18].

Changes in land use (deforestation, urbanisation, infrastructure) and in aquatic environments (drying up) are the main impact factor, accounting for 30.5% of terrestrial and aquatic biodiversity loss. Direct exploitation is the main erosion factor in marine environments (29%), and accounts for 21% of erosion in terrestrial environments and 20% in aquatic environments. Climate change and pollution are also important factors in erosion. While its impacts on terrestrial and marine environments are similar, pollution affects aquatic ecosystems more (17%) than climate change (13%)[19]. Whether the pressures are direct or indirect, this pressure classification is starting to feed into extra-financial reporting standards, albeit far from systematically.

In general, the pressures are largely the result of agriculture, which is a factor in land-use change, climate change, and various types of pollution. They are related to the worldwide spread of Western food habits. Other causes include demographic pressure and economic development, mainly industrial and urban, driven by the acquisition of goods and the movement of goods and people. For business, most of the impact comes from supply chains. The majority of businesses have only indirect links to nature, although as buyers they have of course some influence over their suppliers.

The mitigation hierarchy "avoid, reduce, offset" sequence is a series of measures to avoid environmental damage, reduce such damage as could not be sufficiently avoided and, if possible, offset adverse effects which could neither be avoided nor sufficiently reduced. This action, enshrined in French law, but with little or no international reach unless corporates make a voluntary decision to implement it, aims to encourage the design of lower environmental impact projects, plans and programmes by factoring in their environmental effects as early as possible.

15 Among others, see WWF, *Living Planet Report*, 2020, https://www.worldwildlife.org/publications/living-planet-report-2020
16 https://www.ipbes.net/news/Media-Release-Global-Assessment-Fr
17 OECD (2019), *Biodiversity: Finance and the Economic and Business Case for Action*, report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019.
18 B. Chevassus-au-Louis, J.-M. Salles et J.-L. Pujol, *Approche économique de la biodiversité et des services liés aux écosystèmes*, 2009.
19 https://ipbes.net/sites/default/files/downloads/spm_unedited_advance_for_posting_htn.pdf

Action to avoid and reduce these pressures means acting on the economic, social and cultural drivers of those pressures against a background of economic expansion, increased international trade and world population growth. As the IPBES report points out, the current global response of the various countries and economic stakeholders is inadequate and requires transformative changes. The commitments that will be made by the international community and countries at the Conference of the Parties to the Convention on Biological Diversity in 2021 will be crucial[20]. They will also reflect what society considers possible and acceptable.

Accordingly, business has an important role to play: not only does it influence lifestyles and development, it also decides production methods.

1 Limiting land use and changes in use

Land take and the related fragmentation and destruction of natural habitats are a consequence of human and industrial development, especially the need for building land and artificialised land, linear infrastructures that fragment habitats, and even farmland and woodland which undermine the ability of environments to harbour anything but the monoculture being practised, and so amounts for all practical purposes to built-up. Between 1981 and 2012, built and paved areas in France grew three times faster than the population (CGDD, 2018)[21].

The fragmentation or reduction of natural habitats results in the disappearance of communities and the displacement of the populations that lived there. These displacements have been identified by zoologists and epidemiologists as the cause of the Nipah virus epidemics that occurred in Malaysia and Singapore in the 1990s, and more recently COVID-19[22]. "The pandemic we are experiencing shows that when we go to areas we should not be in, the entire planet suffers. We must leave such areas alone. If we attack each ecosystem to consume more products, we will face more and more pandemics", wrote the economist P. Dasgupta in a report commissioned by the UK Treasury in support of the new COP15 international agreement[23].

The actions taken by businesses to reduce their land requirements vary greatly from industry to industry. For example, mining and quarrying operations, rather than resorting to large open pits can be conducted with small pits that are bored only as operations progress. In this way, it is possible to sharply reduce the area affected with limited economic impact (adaptation of transport areas and storage spaces). Underground mining has even less of an impact, but is of course based on a different economic model.

In the construction sector, reusing land for higher-density dwellings consumes far less land than detached housing developments, which also require more roads. Today, commercial urban development is a subject for debate in France, opposing the construction of out-of-town shopping areas or large logistics platforms to city-centre shops. Development issues are linked to one of the societal changes demanded by IPBES, and accordingly require combined government and business action to be addressed effectively.

The example of Icade, an integrated real-estate developer and subsidiary of Caisse des Dépôts that builds only inside cities, illustrates how companies can choose to limit their activities in order not to use up new land.

20 https://www.iddri.org/fr/projet/plateforme-biodiversite-2020

21 Commissariat général au développement durable (2018), *Objectif "zéro artificialisation nette"*. Éléments de diagnostic, Théma, n° 4, p. 4, https://www.ecologique-solidaire.gouv.fr/sites/default/files/Th%C3%A9ma%20-%20Objectif%20z%C3%A9ro%20artificialisation%20nette.pdf

22 Ph. Grandcolas and J.-L. Justine. Covid-19 ou la pandémie d'une biodiversité maltraitée, *The Conversation*, 25/3/20; J. Vidal. Tip of the iceberg: is our destruction of nature responsible for Covid-19?, *The Guardian*, 18/3/20.
A. Rankovic et al. (2020). A good working basis in the making. How to handle the zero draft of the Post-2020 Global Biodiversity Framework, IDDRI, Policy Brief N° 01/20.

23 *Le Point* interview 2/7/2020.

Designing cities with nature in mind

Orly-Rungis business park © CDC Biodiversité

The first way in which Icade protects nature is by building solely in city centres, on previously developed land where biodiversity is generally very poor to begin with.

In addition to this, Icade works to minimise its impact from the design and construction phase of each building. Biodiversity assessments are performed on all projects in the design phase, including their initial ecological characteristics along with recommendations for improvement.

Icade's efforts to prevent, reduce, and offset any adverse impacts on biodiversity extend beyond the design phase and continue throughout the building life cycle. This is illustrated by the incorporation of green spaces as soon as reasonably possible. More than just a landscaping concern, it demonstrates Icade's commitment to preserving biodiversity and creating new urban ecosystems. Introducing nature into the city offers many advantages, such as increased resident well-being, direct access to locally grown fresh produce, air handling, water treatment and management, etc. This is vital to making cities more resilient in the face of climate change, particularly by reducing heat island effects. Several of Icade's projects have obtained the BiodiverCity label, making this overall policy a competitive advantage to attract local authorities and future residents.

The Office Property Investment Division also signed the first biodiversity performance contract in the operational phase with CDC Biodiversité in 2016. Currently in place for Icade's main business parks (over 100 hectares), the contracts aim to introduce nature into cities while improving employee quality of life.

Icade believes that it is through these efforts that it has achieved a positive impact on biodiversity with regard to activities for which it is directly responsible. They have resulted in a higher Biotope Area Factor[24] for 36% of new builds in 2020 (above the 25% objective).

Lastly, Icade has chosen to participate in the Nature 2050 programme to restore biodiversity. For each sq.m of land developed by its Office and Healthcare Property Investment Divisions, Nature 2050 is committed to restoring and preserving 1 sq.m of natural habitat until 2050.

In the context of climate change, which forces animals and plants to migrate or adapt, one way to reduce the pressure on habitats is to conserve and rebuild green and blue belt networks that seek to maintain and restore continuous spaces where animal and plant species, like humans, can move about and so ensure their life cycle. This is an emerging framework and tool for town and country planning and environmental restoration across France[25]. Linear infrastructure management companies are now actively involved in reducing their impacts by managing vegetation on their land to ensure longitudinal continuity, and by reducing the barriers that such structures also constitute.

24 http://multimedia.ademe.fr/catalogues/CTecosystemes/fiches/outil11p6364.pdf
25 https://www.ecologique-solidaire.gouv.fr/trame-verte-et-bleue

Towards ecological transparency of the national railway network

If the railway network has advantages to constitute ecological corridors under certain conditions (longitudinal approach), it nevertheless requires the implementation of actions to restore or improve continuities at certain points of the network in order to contribute to the green and blue belt (GBB) (transversal approach).

SNCF has been committed for many years to avoiding and limiting the potential effects of fragmentation of new infrastructure projects, with the adaptation of routes and the installation of upper and lower wildlife crossings.

Despite this, collisions with large wild fauna remain numerous: around 1,500 each year, impacting 8,000 trains and resulting in a total of 3,300 hours lost on the entire national rail network. In order to remedy this, SNCF is testing and deploying various actions:

- maintenance of vegetation near the tracks in order to make it as unappetizing as possible and to reduce its volume to prevent animals from finding refuge there,
- in marshlands, setting up gaps in the vegetation bordering the tracks, to encourage the rapid exit of animals that must cross it,
- installation of devices such as anti-intrusion harrows or facilities for free exit from fenced rights-of-way.

In order to contribute to GBB, SNCF is also implementing various projects:

- analysis of ecological continuities with the railway network (carried out in particular in Ile-de-France), with the aim of enhancing the potential of the Ile-de-France rail network while combating the ecological discontinuities caused by the tracks and their structures in the territories and habitats crossed,
- restoration of aquatic continuities with the installation of fishways, in order to ensure sufficient transport of sediments and the circulation of migrating fish, in accordance with its water policy.

Rockfill fishway at the level of the raft of the Vidourle bridge in Gallargues le Montueux

One promising approach in reducing land consumption involves the overlay of functions or activities.
For example, some solar power plants are built high enough to allow farming under the panels. Wind turbines on land under cultivation have a twin benefit, as the land area used up is small and compatible with farming.

Indeed, in the absence of an adequate land-use prevention or reduction programme, businesses can changes in land use, as they are required to do in France and often also in Europe. Several companies, including Total, are committed to applying this sequence to their global operations and offsetting their residual impacts, even where local legislation does not require them to do so. Offset assessment, however, is fuelling vigorous debate of a scientific, social and even political nature. As things stand, the enactment of laws for this purpose has clearly failed to slow down land take in France in any significant manner. Offsetting is often done by improving the condition of existing natural areas or by moving particular ecosystems there, and not necessarily by applying offsets on a hectare-for-hectare basis. This is the core issue in the debate about the effectiveness of the 'no net land take' regulation.

The following example is relevant in that it illustrates the use of farmland for offsetting: to compensate for the negative impact of a wind farm on lowland birds, Engie assisted in the creation of a new agroforestry environment to house a larger number of these birds nearby.

Agroforestry and wind power, a beneficial co-development for soils and biological diversity, but also for the agricultural world and renewable energies.

In 2016, Engie Green supported the planting of agroforestry trees on 18 hectares of Ardennes agricultural plots, to compensate for a loss of habitat for the avifauna of the agricultural plain linked to the establishment of a wind farm. The compensation requested by the state services was 2 ha of fallow per installed wind turbine. At the initiative of Engie and in agreement with the local authorities, on the basis of scientific results from an ecological equivalence study, the fallow has been replaced by agroforestry. Planting just over 4600 linear meters of noble wood trees of several species makes it possible to accommodate several species at different times of the year. In addition, the grassy strips at the foot of the trees are very good refuges for insects and plains species.

In 2019, Engie Green's Biodiversity Pole launched environmental monitoring of these plots for a minimum of 5 years, in partnership with the French Association of Agroforestry and the Regroupement des Naturalistes Ardennais (ReNArd). The double objective of this study is on the one hand to verify the effectiveness of this measure in order to be able to propose it in other projects throughout France, if necessary. On the other hand, during field inventories, surveys necessary for the study of the hydrological and biogeochemical functions of the soil are carried out, with the aim of studying the storage and filtering capacity of water by the soil and possibly be able to highlight functionalities similar to those of certain wetlands. In addition, agroforestry offers other perspectives: thanks to the biomass it creates (which is also measured), it could be developed as a means of storing carbon, and since it is a question of "an agricultural system that has benefits for nature", as a collective agricultural compensation solution.

The 2019 inventories constitute a state 0 with regard to avifauna and bats and therefore do not yet give rise to analyzes. The other measurements were made in parallel at the level of tree lines and on neighboring plots in conventional agriculture.

Among the results of this first year of monitoring, two striking results have already emerged:
1) water infiltrated 11 times faster in trees than elsewhere. Precipitation that falls on agroforestry soil infiltrates and runs off less.
2) the number of insects per hectare was nearly 4 times higher on agroforestry plots compared to control plots, and the specific diversity more than 10 times higher. This suggests a greater presence of their flying predators and therefore a successful measurement.

To be confirmed with further follow-ups!

Agroforestry plantations with a partner farmer, ©Arnaud Brunet for ENGIE

To monitor the effectiveness of such measures so that they can be applied to other projects in France, several years' environmental inventory and follow-up will clearly be required. The continuity of an operation over time is one of the preconditions for sustainable offsetting.

However, land use intensification through functional overlays and urban or agricultural densification is a point for debate because more intensive use creates more value, thereby making the terrain more attractive to economic players, with possibly the opposite effect to the one sought. Indeed, while more intensive agricultural production in theory reduces the area required to meet needs, it also creates more value per hectare, attracting more investors and indeed accelerating land-use change.

Experience therefore suggests that, while some businesses may be frugal, land-use change will only be brought under control through strict enforcement of tough public town and country planning policies.

In the same vein, the environmental economist Guillaume Sainteny[26] argues that land taxation actually runs counter to land-take reduction by offering local authorities and farmers alike a strong incentive for land take. In addition to the need for corporate action, these debates show that pressure on land and habitats can only be reduced through forceful public policies that are accepted, indeed supported, by citizens and stakeholders alike, including those whose economic interests may be adversely affected by such policies. This maturity is slowly emerging, as reflected in the demands of the French Citizens' Climate Convention.

2 Reducing overexploitation of resources

A second source of pressure on biodiversity is decades-long overexploitation of natural resources. Examples include freshwater resources, woodland, fish stocks or other species of wild flora and fauna, and even beaches or other attractive natural sites.

To reduce our consumption of resources, we need to start using them more efficiently. Circular economy, which combines all practices contributing to less resource utilisation without altering the services provided, appears to be one of the most promising ways forward, but will not be dealt with in this publication.

Mainly regarded as a measure to reduce greenhouse gas emissions, it could also have a significant effect on biodiversity if it manages to reduce the total consumption of other resources too.

It is easier to reduce the overexploitation of some ecosystems or resources when not too many players are involved. Kering's know-how, for example, has helped the company identify overgrazing on the plateaux of Mongolia, then narrow it down to a specific sector, and ultimately develop management rules and related traceability schemes with ecosystem stakeholders.

KERING Sustainable Cashmere at Kering

After calculating Kering's environmental footprint across materials and regions, a surprising result emerged: the high impacts of the cashmere supply chain. In Mongolia, the number of livestock of cashmere goats has more than tripled in the last thirty years. As a result, more than 70% of Mongolia's grasslands are now classified as "degraded" as a result of overgrazing. This has created cascading consequences on the region's flora and fauna, and threatens at least eight keystone endemic species. While some activist groups are calling for complete bans on cashmere, this type of action would have devastating economic impacts on regions such as the Gobi, where a large portion of the population relies on cashmere for income. As such, Kering launched a partnership with the Wildlife Conservation Society in 2015 to help herders adopt new sustainable grazing models in Mongolia's South Gobi Region. This includes not only improving animal husbandry and fiber quality, but also improving the health of rangelands. Stanford University joined the partnership in 2017 and is currently building models using NASA data in order to facilitate a shift towards rotational grazing.

Working with the Snow Leopard Trust, the project also uses camera traps to monitor apex predators on the ground and provides herders with the means to introduce a suite of wildlife-friendly practices. As a result, the project provides Kering Houses with a responsibly-produced cashmere that is 100% traceable. In 2019, more than 13% of the cashmere used in the Kering Houses came from Gobi cashmere.

In order to facilitate positive change across much wider scales, the project is also collaborating with herding cooperatives, the government, and other key stakeholders in order to standardize the definition of 'sustainable cashmere' in Mongolia.

26 G. Sainteny. La fiscalité peut-elle contribuer à limiter l'artificialisation des sols ? *Annales des Mines - Responsabilité et environnement* 2018

This may be a specific case, but it shows a collective momentum, suggesting that voluntary practices of this sort are bound to pave the way for more incentive-based or binding public policies.

At the local level, conflicts over the use of freshwater resources are obviously a major aspect of this global overexploitation. French businesses have fully grasped this fact and are among the world leaders in this type of management[27].

Intensive logging and overfishing are the most visible global examples of overexploitation. Public opinion is now increasingly aware of this issue not just in the West, but also in South America, Oceania and Asia.

While the number of stakeholders is too big to devise a solution along the above lines, gradual headway is being made in end markets with increased use of method-of-production labels that enable consumers to identify the resources coming to market from sustainably managed sources. In 2018, the share of global wild fish catches from certified fisheries was 12% and growing. The share of FSC- and PEFC-certified woodland was 11% of global forest area. These are highly positive outcomes for voluntary actions, but far too modest to have any meaningful impact on the overexploitation of the resources concerned. Going further would require strong political will and government action in all countries as well as changes to international trade rules.

3 Factoring the consequences of climate change into biodiversity

Since climate change is the third source of pressure on biodiversity, any action to reduce direct or indirect greenhouse gas emissions has positive effects on biodiversity. Because corporate climate strategies are widely discussed elsewhere, we will not cover them in detail in this publication. However, climate issues can at times conflict with biodiversity issues. In 2017, the Biodiversity Research Foundation drew stakeholder attention to the "liaisons dangereuses" between energy transition and biodiversity[28]. Indeed, the beginning of energy transition and the increased use of biomass that accompanies it, has already led to forest areas shrinking in Europe.

Similarly, the use of emission offsets can result in intensive forestry practices (eucalyptus plantations or other fast-growing species) with adverse effects on biodiversity, and in some cases can contribute to counter-productive land-use changes, much to the concern of a number of operators. The term "ecological transition", which is gradually replacing "energy transition", was coined precisely to demonstrate a willingness not to harm biodiversity by dealing exclusively with climate. The practices of EpE members increasingly incorporate both issues in tandem. The balance between positive climate effects and threats to biodiversity is anyway a difficult one to achieve, suggesting that energy- and material-saving solutions are the best way forward, regardless of the issue.

The box below illustrates how an insurance company is gradually factoring both issues into its activities.

27 *See From A to W*, http://www.EpE-asso.org/abc-deau-avril-2018/
28 https://www.fondationbiodiversite.fr/communique/biodiversite-transition-energetique-enquete-liaisons-dangereuses/

SIACI SAINT HONORE

Biodiversity-friendly renewable energy insurance solutions

The preservation, promotion and restoration of biodiversity are major challenges for every company and every individual, whatever their position in the economic value chain. They include a reduction in the use of fossil fuels and the development of renewable energies (RE).

Siaci Saint Honoré has chosen to support its clients in the development and operation of their renewable energy projects, such as solar plants, wind farms, biogas plants, anaerobic digestion, geothermal energy and hydraulic dams, by making its expertise and its ability to create insurance solutions available to them.

These solutions contribute to the sustainability and solidity of each operation by taking account of its specific factors and characteristics through prior analysis, including in terms of natural environments and stakeholder relations.

By way of example, the environmental liability insurance solutions put in place by Siaci Saint Honoré make it possible to control levels of soil artificialization by freeing up potentially polluted land, so that clients can make it available in complete safety and promote the installation of RE production sites on the land for which they are responsible.These same products also make it possible to convert former waste lands to natural compensation sites, under the French Ministry for Ecological Transition's mitigation hierarchy.

From construction to operation and then dismantling, wherever the project is located, in mainland France or the most remote regions of the world, the coverage is customized to integrate it into the business model of clients who want to play a part in energy transition, thereby promoting better use of resources and the preservation of associated biodiversity.

Over and above the financial security obtained through insurance guaranteeing the viability of any sustainable investment, Siaci Saint Honoré's support is also channeled through its expertise and networks when the coverage is being put in place, thereby promoting greater resilience on the part of the organizations and the environment which may be impacted by a loss.

4 Dealing with pollution

This encompasses both direct pollution from activities (chemical releases, waste, noise, light) and indirect pollution (waste from consumption of products, effect of products on the environment in which they are used, etc.). Today, industrial and indirect pollution are heavily regulated and managed by the companies themselves under duty of care. However, diffuse air, water and soil pollution seems to be a growing challenge and is the focus of ever stronger societal expectations on account of the fact that biodiversity issues are combined, indeed confused, with public health.

Water pollution in particular is of great concern to people. A study of priority sources particularly threatened by pollution establishes that prevention measures resulting from the public consultation on the environment (Grenelle de l'Environnement) are generally effective in obtaining drinking water without the need for costly decontamination[29]. Agricultural pollution caused by the presence of nitrates and pesticides in groundwater under catchment areas is the main threat to resource quality, as we will see in the dialogue and preventive actions set out below.

The point is to manage environmental pollution through both wastewater treatment and treatment of drinking water at dedicated and ever more closely monitored treatment plants.

29 https://www.quechoisir.org/action-ufc-que-choisir-enquete-sur-102-sources-d-eau-potable-grenelle-la-pollution-agricole-de-l-eau-n-est-pas-une-fatalite-n65183/

Protect water resources and biodiversity on a water catchment area

On the Flins-Aubergenville water catchment area (Yvelines, France), SUEZ Water France operates water drilling to supply more than 500,000 Ile-de-France residents. But this aquifer is affected by diffuse pollution, especially nitrates and pesticides.

Agricultural activity contributes to diffuse pollution and its intensification leads to a decrease of biodiversity. In France, globally, the population of agricultural birds has drop by a third since 1989. Climate change adds to the biodiversity decline: in 2019, 87 French departments were restricted in the use of water and 42 in a state of drought crisis, generating significant impacts on water availability, agricultural productivity and biodiversity.

Collaborative actions with the agricultural sector are a way for SUEZ to make territories more resilient, protecting the water resource and ensuring the future of biodiversity in cultivated areas.

On this water catchment area of Flins-Aubergenville, in response to a deterioration of water quality, SUEZ committed at the end of 2009 to an approach to reduce diffuse pressures and accidents of agricultural and non-agricultural origin "at the source". In collaboration with the Chamber of Agriculture Île-de-France and the organic farmers' group, ten farmers on nearly 650 ha, or 50% of the priority area, have been made aware and supported to develop production methods compatible with water quality objectives.

Within the framework of the Water and Climate Territorial Contract financed by the Seine-Normandy Water Agency, SUEZ is, since 2019, partner of the Grand Paris Seine & Oise municipality to mobilize and support local stakeholders to implement actions aimed at preserving or regain the quality of water and biodiversity. The action program, developed in consultation with local actors, includes studies to improve knowledge of water quality, pollution pressures and their impacts, to propose innovative tools (payments for environmental services or labeling for example).
The Water and Climate Territorial Contract aims to support farmers in reducing the use of phytosanitary products and fertilizers but also in the development of biological agriculture. It plans to facilitate the development of agricultural sectors making it possible to promote low chemicals production, for example through local and organic products in collective catering or alfalfa favorable for water resources and biodiversity. Work is on progress to implement payments for environmental services or a labeling aiming to promote the productions local areas respecting a specification of practices favorable to water quality.

The latter example also shows a new and important element in the thinking on how to mainstream this type of action. The decontamination strategy works better if it is initiated and supported by a water market that facilitates the economic transition model for farmers. With regard to diffuse pollution, though, the number and diversity of stakeholders required to agree and cooperate means that negotiated outcomes and changes in practices are often slow. Even with the economic momentum discussed above, change cannot be left to voluntary action alone. Public financing and management rules are both crucial in changing production methods.

5 Curtailing the spread of invasive species

The spread of invasive species is facilitated by international transport and the ability of some species to proliferate in environments where they do not have predators, but where they could come into direct competition with, or cause the destruction of, endemic species. Knowledge of invasive alien species makes it possible to manage them, as illustrated by the collaborative work between French corporates and the IUCN French Committee.

Ciments Calcia
HEIDELBERGCEMENT Group

Combating the spread of invasive alien species (IAS)

As invasive alien species are one of the five recognized causes of the erosion of global biodiversity, it has become clear that, within the framework of the partnership between the French subsidiaries of the HeidelbergCement group and the French committee of IUCN, one of the actions was to implement a strategy to combat these invasive alien species.

In fact, in view of the presence of these invasive alien species in quarries and on operating sites, Ciments Calcia and GSM developed a mapping of their IAS in 2014 in order to adopt specific management plans. This first inventory, carried out on site by the employees, made it possible to highlight the environmental impact of exogenous species on the local flora and fauna. It was followed by a campaign to raise awareness among employees, supplemented by a guide published by the French committee of IUCN in partnership with several companies[30], as well as posters to identify the different species and on-site training.

In 2018, this also gave rise to a second exhaustive census of the IAS present. The analysis of the inventories was pooled, thus creating a real network for sharing knowledge and best practices to control the spread of these invasive species. The feedback and sharing of information help to better understand and fight against IAS while respecting the regulations associated with these species. The preservation of native flora and fauna is enhanced and strengthened by and as a result of the experience of each person.

30 https://uicn.fr/gestion-eee-sites-entreprises/

For air and maritime carriers, there are preventive solutions against new invasive alien species, such as ballast water management, aircraft disinfection, and so on, but they are inadequate because they do not cover all transfers of goods and persons. However, moves are under way to make them more widespread.

It is clear from the foregoing that, for each of the pressures on biodiversity exerted by human activities, business has or can identify solutions. These solutions will however not be effective or cost-effective without proper public policies. We have touched on some of them, and observed they will spread only if there is a replicable business model.

Solutions could be driven by economic measures (carbon pricing, fishing quotas, payment for environmental services, taxation of built or unbuilt land, etc.), standards, policies and measures adapted to each situation (land use planning, eco-conditionality of operating permits, etc.). Yet, according to Yann Laurans, Director of the Biodiversity and Ecosystems Programme at IDDRI, the problem is no longer one of national or international law, but of implementation. "We are making progress on paper. However, this does not translate into general progress", says the researcher.

For environmental economist Harold Levrel, biodiversity legislation is hardly enforced in France, with a crying lack of punitive measures against non-compliance. "If we want our economic system to take better account of biodiversity and its components, it is important that there is strong political will to enforce biodiversity conservation legislation by controlling, penalising and encouraging economic stakeholders to comply. Such a strategy can help to create new economic opportunities, reduce trade deficits, and facilitate substitution between old and new economic sectors[31]".

Both analyses suggest that stakeholder awareness and motivation is key to stopping biodiversity loss. If more ambitious public policies are to be implemented, if less pressure-creating goods and services are to find markets despite the extra cost, all citizens and consumers must agree to it in a way that satisfies everyone's vital needs. The crisis triggered by Covid-19 is perhaps an opportunity to accelerate public awareness and strengthen collective will.

Yet, even such a serious wake-up call as this, while it may help build collective awareness, is not sufficient in itself to mobilise and drive action. Positive achievements are more effective in inspiring others to act. As we will see below, corporates are well poised to take such positive action.

31 The French Foundation for Biodiversity Research, D'une économie de la biodiversité à une économie de la conservation de la biodiversité, Opinion coordinated by Harold Levrel, June 2020, https://www.fondationbiodiversite.fr/wp-content/uploads/2020/06/03-06-2020-Opinion-Economie-biodiversite.pdf

CHAPTER 2

Recreating biodiversity-friendly spaces and conditions

According to many nature experts, the best nature-friendly action is to let nature act. This does not mean unquestioning acceptance of the belief that "nature always knows what is good for it", that the US deep ecology movement puts it in its "Nature knows best" philosophy. Still allowing ample breathing space to nature indeed seems to be the best protection for biodiversity. "Environmentally, nature left to itself is responsible for the richness and complexity of communities and of the interrelationships between biocenoses"[32]. Rather than giving in to the theory of a 'garden planet' under full control, is it possible to combine the benefits of this spontaneity with large-scale human intervention?

Two messages can usefully guide positive nature-friendly action by business. The first is the recommendation by researcher Luc Abbadie[33] to all corporates, whosoever they may be, to "cultivate heterogeneity" in their activities (seeds, crops, products and services, habitats, travel, etc.), even if it means shaking up the current industrial model based on the standardisation of production processes and the optimisation of each stage of production. This may sound tautological, but it is worth noting that standardisation is detrimental to diversity and optimisation is damaging to biodiversity, which if anything fosters resilience to all kinds of outside influences. Adapting to nature rather than mastering its use by reducing it to optimised models is still a pioneer approach, and one major challenge will, for example, be how to incorporate this approach into engineer training.

The second message is from Inger Andersen, former Director General of IUCN. Despite the fact that ecosystems and biodiversity are complex issues, she summarises what needs to be done in three tasks[34] that are perfectly consistent with the above principles of letting nature act and cultivating heterogeneity:

- keeping land and marine wilderness areas wild;
- managing agricultural, forestry or maritime productive areas sustainably by improving their biodiversity;
- reintroducing nature into urban and industrial artificialised areas.

Many companies have already embarked on some large-scale projects in these three areas.

1 Keeping wilderness wild

1.1. Protecting natural spaces

With humans everywhere on the planet, it is important (albeit difficult) to conserve spaces without human intervention so that there is a reference for spontaneous ecosystem changes which allows us to study their resilience better.

By definition, business is not very active in these spaces, whose creation and protection is primarily the responsibility of governments, based on the different levels of protection provided by the "protected area" status. The new European biodiversity strategy, the CBD zero draft and the future French protected areas strategy 2020-2030 lay down the same 30% target to be achieved within the next few years. Protected areas today account for about 29.5% of French land and 23.5% of French waters, compared to 15% and 7% globally.

Business action primarily consists in respecting such areas, but also in contributing to their restoration and monitoring. Spatial observation, which is minimally invasive, is of particular interest in this context.

Business action, however, is especially suitable for relative protection areas, which do not prohibit economic activity or human presence, such as France's regional nature parks and many others around the world. These areas (which account for two-thirds of protected land areas in France) are governed by relatively unrestrictive charters based on voluntary action by business and other stakeholders.

32 https://jne-asso.org/blogjne/2014/10/23/la-meilleure-protection-laisser-faire-la-nature/
33 https://planet-vie.ens.fr/auteurs/luc-abbadie
34 Reproduced on the Business for Nature website, www.businessfornature.org

NGOs in the Campaign for nature[35] coalition are concerned about how those spaces are managed. Businesses could adopt a host of innovative initiatives that comply with these charters under which such areas would become laboratories for cohabitation between wilderness and business, provided certain precautions are taken operationally, and nature-based solutions in particular are used to limit impacts as far as possible.

The following box illustrates the potential for positive cohabitation.

HERMÈS PARIS

The filtering gardens of Saint-Louis

The existence of natural raw materials in the surroundings of the "Vosges du Nord", especially in Saint-Louis-lès-Bitche, has conditioned the installation in 1586 of what would become the "Cristallerie de Saint-Louis", a subsidiary of the Hermès group. Preserving natural resources is a founding element of Hermès, notably water preservation. Water is at the center of everyone's preoccupation as it moves through each workshop and assists craftspeople in every manufacturing steps: washing tools, cooling molds, cutting and polishing the crystal in order to reveal its sparkle.

Today, the manufacturing site is in a territory recognized since 1989 as UNESCO cross-border Biosphere reserve.

Willing to respect the biodiversity, the manufacturing site of Saint-Louis has decided to integrate an innovative nature-based solution to filter industrial wastewater. Since 2009, the "Cristallerie de Saint-Louis" is using a phytotreatment technique to purify some of the water released. Such facility is eco-friendlier and prevents from using more classical physico-chemical approaches. In a green setting, this nature-based solution for water treatment installed fits harmoniously within a wetland.

The phytotreatment technique used does not need energy or chemical supply to optimally purify the water and its performance is superior to the one of a physico-chemical technique. It relies on 3 filtering basins. Plant filters, reeds of the phragmites family planted in peat, trap suspended matter and nitrogen pollution. Then, mineral filters, surrounded by perennial grasses (miscanthus), trap the soluble metal compounds by drainage. Eventually, plantations of endemic species complete the system and integrate it into the natural landscape.

Recently the site hosting the filtering gardens in Saint-Louis has opened its doors to the public, educating visitors to the virtues of such water treatment approach. Besides, around the visit people can also discover some Highland cattle, which are an alternative to machines by doing eco-grazing for the maintenance of valleys and wetlands. Together with the Museum of the Cristallerie, these gardens contribute to attract tourists locally.

Ultimately, the "Cristrallerie de Saint-Louis" aims at improving its filtering gardens efficiency by reusing the clean water produced into the site workshops, thus reducing even further its environmental footprint.

Vegetated filters – Saint-Louis' gardens

35 https://www.campaignfornature.org

Corporate action to reduce indirect pressures or enable protected areas to adapt to climate change, pollution or invasive species is all the more relevant as even protected areas suffer from droughts, pest invasions, pollution and waste. The development of water treatment plants in Mediterranean cities is one of the best protections for the protected marine areas of this sea. Other pathways of positive action include the establishment and use of ecological continuities between protected areas to facilitate their adaptation to climate change.

1.2. Restoring habitats for endangered species

There are also cases where ecosystems in a near-natural condition provide services that drive businesses to conserve or improve that condition. This is clearly true of many tourist sites. The two examples below show how other economic issues at stake could drive such rehabilitation. While it is hard to generalise about sites whose value also derives from their exceptional character, they could inspire other stakeholders in comparable situations.

LVMH

Nature-based Solutions and protection of endangered species

The Glenmorangie tripartite DEEP project (Dornoch Environmental Enhancement Project) for the protection of the ecosystem of Dornoch sanctuary.

One of the two Glenmorangie whisky distilleries is located in the North of Scotland, on the banks of a vast marine estuary and worldwide-known site of particular scientific interest: the Dornoch Firth.
Once very abundant in molluscs, the seabeds have suffered from overfishing which have caused the gradation of its ecological state. Aware of the role that European flat-oysters could play in the filtration of its distillation residual effluents (after anaerobic treatment), and to go beyond regulations, Glenmorangie has partnered with NGO Marine Conservation Society and set up, with the help of researchers from Heriot-Watt University in Edinburgh, a scientific operation to deploy a nature-based solution.

Together, they developed the DEEP (Dornoch Environmental Enhancement Project). This synergy between public, academic and private partners is the first of its kind in Europe. The pilot phase for the reintroduction of European flat-oysters (retained in a private fishery) has been successful. In the long-term, nearly 20 000 oysters will form a reef, allowing the fixation of 200 tons of carbon and 20 tons of nitrogen while using the filtration capacity of the molluscs to raise the estuary water quality up to the "excellent" level.

A partnership and a reserve to save vicuna in South America – Loro Piana

In Peru, the Italian Maison Loro Piana, which has unique savoir-faire regarding the most precious fibers, has made a major contribution for the preservation of vicuna, a camelid living in the Andean highlands. Although present by millions at the time of South America's conquest, this species was, 25 years ago, identified as seriously endangered, and classified within CITES Appendix 1. By working in partnership with the Peruvian government and breeders, creating a first conservation park and importing breeding techniques inspired by Australian methods, Loro Piana has directly contributed to save the vicunas from extinction. The livestock now stands at about 400 000 heads. The Maison successfully markets this very precious wool which, beyond cashmere, has become its emblematic material.

Since 2019, LVMH has drafted an Animal-based Raw Material Charter for its suppliers which prohibits the use of species listed in the Appendix 1 of CITES or threatened with extinction on the IUCN Red List. This Charter covers, in addition to the conservation, commitments on raw materials' traceability, animal welfare and the preservation of men, women and the environment. It is complemented by a Scientific Committee that supervises research projects launched in these areas in order to contribute to knowledge improvement.

2 Managing productive areas sustainably by improving their biodiversity

Most land and marine areas are actually used to produce natural resources. These areas include forests, farmland, freshwater, ocean fishing grounds, aquaculture zones, and infrastructure. Managing them sustainably involves reducing or eliminating pressures, maintaining soil fertility, and improving the production and delivery of ecosystem services. Businesses of all sizes have a major role to play in this management. So do civil society, consumers and public authorities, because the economic balance of many of these activities is based on public policy.

The alliance we refer to between human activities and spontaneous nature is in fact quite complex and involves the use of new techniques and approaches grouped under the term "ecological engineering".

2.1. Developing biodiversity through ecological engineering

According to the French Union of Ecological Engineering Professionals (UPGE) "ecological engineering is part of a sustainable approach that seeks to enhance and develop biodiversity through concrete and adapted actions on targeted ecosystems". Broadly speaking, this concept encompasses all stages of the conservation or expansion of an environment's or territory's biodiversity, based on methods that mimic or use the natural processes of ecosystems. Ecological engineering techniques are variously used in the management, maintenance and rehabilitation of natural environments. All ecological engineering operations follow upon completion of an initial stage (ecological assessment) and of goal setting. To be effective, such operations must be carried out over time, accompanied by appropriate management and scientific monitoring based on previously defined indicators.

The growth of ecological engineering within VINCI

As an investor, builder and operator of buildings and infrastructure, VINCI contributes to the development of territories and is therefore close to natural environments.

Thanks to the knowledge and experience in construction, the entities of the group have gradually extended their technical capacities. This was initially done in the field of hydraulic development techniques, with realizations such as dyke reinforcement, sheet pile driving, support of riverbanks or expansion basins floods, etc. Specialized subsidiaries were therefore created already in the 1990s. In addition, the extraction activities made considerable progress in quarriers' site remediation, building capacity in ecological development (resloping gentle banks, creating ilots or screes ...).

Thanks to these achievements, several entities of the group are specialized in ecological engineering and continuously develop new techniques (restoration of wetlands, treatment of invasive species, etc.). They also adhere to main recognized professional unions. Among the numerous brands and subsidiaries developed in the latter years to make ecological engineering a new profession:

- Sethy (created in 1993), Cognac TP, GC3E are subsidiaries of Eurovia which offer ecological engineering services, in particular for linear infrastructures in France for many years.

- Equo-Vivo is a brand created in 2017, relying on VINCI Construction Terrassement 's capabilities and experience.

- VINCI Construction Maritime et Fluvial brings together six specialized subsidiaries of VINCI Construction since 2018. It operates in France and abroad and is notably specialized in the ecological restoration of coastal environments.

- Urbalia is a consulting office created in 2017 in partnership with AgroParisTech which is dedicated to the integration of biodiversity in urban projects in particular by proposing solutions based on the environmental engineering

Regarding the management of transport infrastructures, many environmental engineering works are carried out in order to better integrate the infrastructures into the territory. Concessions, particularly linear infrastructures, are taking the ownership of ecological engineering. Thanks to their feedback and scientific monitoring carried out on managed infrastructures, these entities allow to test new techniques and refine existing practices related to ecological development.

The specificity of this branch of knowledge is its "systemic" approach combining very diverse disciplines from soil physics and water management to spontaneous plant animals or human life dynamics. It uses new techniques such as environmental DNA mapping that draw on the most sophisticated genomic and digital technologies.

SPYGEN®

Environmental DNA to monitor biodiversity on a major scale

The living world is a vast inter-connected network, most of which is invisible and still largely unexplored.

Now, thanks to environmental DNA technology, it is possible to draw up an inventory of all living species in an ecosystem from a sample of water or soil. This method will help us find which solutions to put forward to better protect our natural heritage from now on. Already tested at thousands of sites around the world, this technology improves the efficiency of biodiversity inventories and rare species monitoring.

For instance, a study carried out in 2016 on the entire River Rhône in France revealed that in just one session of environmental DNA reading it was possible to detect as many species as in 10 years of monitoring through electrofishing.

This non-invasive method also has the advantages of being easy to roll out on the ground and of reducing the cost of cataloguing operations, meaning it could be deployed on a major scale very quickly. So, by using standardized eDNA methods around the world and on a long-term basis, it would be possible to: better monitor endangered, invasive or pathogenic species; better understand or guide the evolution of the state of health of ecosystems during construction or restoration projects; help identify human activities that are the most respectful of biodiversity; and better understand the impact of global changes on all life forms.

To find out more: **www.spygen.com**

2.2. Adopting environment-friendly site management

Business has a sizeable built land stock on which they run their operations. The rest consists of land reserves, pathways and buffer zones to reduce risks and harm to populations. On these spaces, companies have ample latitude to adopt ecological management practices, as do local authorities on their land.

Ecologically sound site management involves implementing environment- and biodiversity-friendly maintenance practices. The principle of differentiated management on which this is based consists in making a trade-off between fairly strict, constraint-based management of useful spaces and naturalist management of reserves designed to protect the natural environment[36].

Green spaces in urban and semi-urban environments can accommodate specific and significant biodiversity if managed with this goal in mind. In France, public and private green spaces cover more than one million hectares, i.e. more than four times the size of nature reserves in Metropolitan France. The area occupied by corporate sites (built and unbuilt) accounts for more than 10% of the total area of metropolitan France. These varied spaces, even fenced, can accommodate many animal and plant species and become biodiversity reserves in their own right.

Several tools to support the ecological management of public and private sites have been developed by business in partnership with environmental associations.

36 https://www.actu-environnement.com/media/pdf/natureparif-gestion-ecologique.pdf

Veolia solutions for a change of scale

Veolia has set itself two objectives aimed at accelerating its transition to more virtuous management methods for its green spaces by 2023: "zero" use of phytosanitary products on 75% of the sites and the deployment of ecological management on 75% of the sites with more than 1 ha of green spaces. These commitments, made at the highest level of the company, involve the mobilisation of all of the Group's business lines and employees.

To support this ambition, Veolia has developed various tools for operators and professionals involved in the management of green spaces. Developed in partnership with the French Committee of IUCN, they facilitate the large-scale implementation of ecological management on sites.

Demonstrating that the implementation of ecological management is not necessarily more costly: the EcoLogiCal calculator compares the economic and ecological balance sheets of a so-called traditional management of green spaces with more environmentally friendly practices. A self-assessment, in the form of an online questionnaire, gives rise to a report including recommendations and personalised technical advice to accompany the sites in their changes of practices. The tool was designed by Veolia in partnership with the Noé association and the support of Ecocert Environnement.

Accompanying our suppliers through a mutual commitment to good practices: Veolia's green spaces charter commits our teams and landscapers to adopt more ecological management practices and invites them to rethink a less controlled perception of nature.

Deploying actions autonomously: an ecological management guide has been developed to guide step by step the implementation of actions favourable to biodiversity on sites.

Find our online tools:
ecological management guide:
https://www.veolia.com/sites/g/files/dvc2491/files/document/2016/06/Guide-de-gestion-ecologique.pdf

Ecological:
https://eco-logical.fr (available in French only)

Noé's gardens

Some of those operations are based on business models driven by growing awareness on the part of public authorities and consumers of the significance of biodiversity.

The honey producing grasslands in US solar parks are a case in point.

Solar energy that respects pollinators

Since 2016, ENGIE US Solar has included greening as a standard element in the design of ground-based solar parks in the United States. They use mixtures of herbs and flowering plants that grow naturally in the area. This provides a favorable ecosystem, in particular, for pollinators.

These natural habitats protect the food chain from pollinators. The flowers provide nectar to insects. Birds eat seeds and insects. The stems and brush of plants provide nesting and safety for all. Each site receives 25 different floral and herbaceous species.

A site matures between 1 and 3 years depending on local conditions. Once the plantations have reached maturity, this requires very little maintenance in terms of the management of green spaces and does not in any way hamper the proper functioning of the solar panels and their maintenance.

The monitoring and evaluation of the effects on biodiversity are carried out with external experts according to a grid of standardized criteria.
Today, this represents almost 300 ha of plantation, for an installed capacity of 127 MW. 100% of ENGIE Distributed renewables solar parks, spread across 14 states, benefit from this good practice.

In addition to the positive effects on biodiversity, this technique helps prevent erosion and soil degradation, absorb rainwater, and reduce airborne dust by 80%.

This action is an excellent tool to increase the acceptability of solar parks. It is perfectly reproducible in many regions of the world. In view of the positive impacts measured, in January 2020, 7 American states promulgated regulatory texts to promote the development of solar energy that respects pollinators.

https://engieussolar.com/pollinators/

Solar parks with flower ©ENGIE Distributed solar, North America

2.3. Initiating new agricultural practices

Agriculture lies at the heart of today's ecological challenges. It affects and is affected by climate change. Modern farming methods often disrupt biodiversity. The ability of agriculture to meet the many needs for which it is essential, including CO_2 sequestration, to feed humanity, and to shelter biodiversity is limited and dependent on individual and collective choices as well as knowledge. What's more, agriculture, at least in Europe, occupies most of the land (28 million hectares in France).

Multiple, more sustainable agriculture initiatives are under development, but struggling to get widely established. How to scale up agricultural practices that are overwhelmingly biodiversity-friendly?

"*Ten years for agroecology*"[37] - the title of the scenario developed by IDDRI speaks for itself. According to this study, we have a decade to develop agroecology at the European level and to jointly address the challenges

37 https://www.iddri.org/en/project/ten-years-agroecology-europe

of sustainable food, biodiversity conservation and the fight against climate change. If pesticides and synthetic fertilizers are abandoned, agro-ecological infrastructure (grasslands, hedges, trees, ponds, etc.) extended, and healthier diets (with fewer animal products) adopted, it would be possible to feed 530 million Europeans by 2050 and achieve a 40% reduction in GHG emissions compared to 2010. This scenario promotes a land-sharing approach whereby almost all land combines lower-yield food production with environmental protection.

On the other hand, some carbon-neutrality scenarios opt for a land-sparing approach, where agricultural yields are maximized on dedicated plots to free other land, which is then either reforested to increase the biogenic sink, or used to produce biomass energy. This approach does not necessarily leave much room for biodiversity.

The new road map of BASF France shows that agroecology has several definitions and guidelines. A recent report by France Strategy lists twenty-three specifications or benchmarks that claim to define the main principles of agroecology in the public and private[38] sectors.

Agroecology: at the heart of BASF France Agro Division strategy

Agriculture must provide solutions to 21st-century challenges, from climate change to biodiversity loss, and meet consumer expectations for food produced to enhanced environmental standards. BASF France Agro Division has responded by identifying the expectations of its various stakeholders, and placed agroecology at the heart of its new strategy. BASF aims to develop sustainable, profitable and innovative crop systems, promote functional[39] biodiversity, and incorporate innovations to reduce inputs and their impacts on natural resources. This agroecological strategy is set out in a 2030 roadmap based on five pillars, 20 commitments, and 37 workstreams, each with measurable targets.

Biodiversity conservation, including the development of the BiodiversID[40] farm network, has been key at BASF for more than a decade. We have naturally incorporated this expertise developed in partnership with NGOs, technical institutes, academics, researchers, and others, into our roadmap.

BASF has stepped up its efforts to provide farmers with agroecological crop systems that promote beneficial biodiversity to better control pests in combination to other agronomic and crop protection levers. For example, BASF is promoting agroecological crop systems on oilseed rape with farmers to improve the crop's vigour at emergence and reach a phenological stage more quickly in order to better resist pest attacks and ultimately limit the use of conventional insecticides.
These innovative crop systems combine various complementary levers including early seeding dates, legumes mixed with oilseed rape, biologicals, and reduced-dose herbicides. An entomologist produces inventories of useful auxiliary insects to check their theoretical contribution to pest control and gain a better understanding of their biology and how to promote their presence in order to measure the effectiveness of these crop systems.

https://www.agro.basf.fr/fr/actus/actualites_basf_france_division_agro/manifeste_pour_une_transition_agroecologique.html

https://www.agro.basf.fr/fr/cultures/colza/reussir_implantation_colza/

38 https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/fs-2020-dt-agroecologie-aout.pdf
39 Which plays a role in the regulation of bioaggressors.
40 https://www.agro.basf.fr/fr/agroecologie/biodiversite/programme_biodiversid/

Another recent study by France-Stratégie seeks to compare different pathways of development by combining ecological benefits and economic balances[41]. However, agricultural policies around the world are mainly geared towards product competitiveness on world markets. Food policies are just starting to factor in environmental issues, coupled with health concerns.

InVivo, the French agricultural cooperatives union, is working on new methods of agricultural and wine production that constitute a "3rd path" in agriculture, with the aim of addressing consumer expectations as well as social and environmental issues. This sustainable agriculture model embraces the fight against climate change and biodiversity conservation by leveraging the digital technologies increasingly being employed in agriculture.

It seeks to mainstream more biodiversity-friendly agricultural practices, as the following examples illustrate.

Semences de France: Numerous biodiversity initiatives

The work of Semences de France, a subsidiary of InVivo and France's third largest seed company in terms of turnover (€121 m in 2018–2019), illustrates this ambition. Jointly owned by InVivo and 48 agricultural cooperatives, Semences de France involves its cooperative shareholders in the development of its ranges, in order to best meet their needs and more specifically to be able to provide them with effective solutions for sustainable food chains. Seeds have an essential role in biodiversity, be it in the variety of plants or in aboveground and soil biodiversity via auxiliaries.

Producing seeds that are more resistant to pest pressure therefore makes it possible to reduce the use of phytosanitary products. Semences de France is researching this resistance and is also working to develop ready-to-use seed mixtures to simplify companion planting. This agronomic technique involves growing the main crop in proximity with associated crops and, depending on the varieties chosen to strengthen the plant's nutrition, it can prevent the growth of weeds or even control pest pressure, the result being a reduction in the use of chemical inputs.

Over the years, Semences de France has also created a wide range of cover crops. These iSol® covers help combat agricultural soil erosion and enrich soils with organic matter. They also promote biodiversity in agricultural environments by using melliferous, nectariferous or faunistic species (in the case of species that represent an effective natural shelter against predators with a high grain and fodder potential, for example).

With the aim of integrating agricultural cooperatives into sustainable food chains always in mind, Semences de France has developed a range dedicated to organic agriculture, comprising more than 50 varieties of seeds. New varieties under development will soon complement this range, for example the APEXUS wheat variety, specifically and exclusively chosen because of its suitability for organic farming.

With all of these developments, Semences de France is steering its business towards the preservation and development of agricultural biodiversity: Solutions are being developed with and for member agricultural cooperatives to structure the supply of volumes and quality to sustainable food chains.

41 https://www.strategie.gouv.fr/publications/performances-economiques-environnementales-de-lagroecologie

Agroforestry is an emerging farming method that combines trees with crops. PAPREC Agro, a subsidiary of PAPREC, illustrates that quality, productive farming methods and local agriculture can be associated with soil conservation and restoration.

Integrate agroforestery and polyculture in core activities

PAPREC Agro is the subsidiary of the PAPREC group dedicated to the recycling of organic waste and the production of compost to develop agroforestry and agroecology.

The PAPREC Agro site in Dordogne brings together a composting plant and an eco-farm in order to promote a "return to the soil" and organic development through sustainable, local and productive agriculture. The aim is to demonstrate that agroforestry makes it possible to increase carbon storage in the soil in line with the 4 per 1000 strategy, and offers productive, quality, local agriculture, while making it possible to restore the soil.

On a 14-ha-site, PAPREC Agro recycles more than 80,000 tonnes of organic waste and produces about 40,000 tonnes of standardized compost and 30,000 tonnes of biomass. The compost is then sold to 350 local farmers. In parallel with its activity specializing in composting and recycling wood and organic waste, the eco-farm allows the development of agroforestry practices thanks in particular to a couple of farmers: no tillage, organic fertilization and agroforestry combine together to maximize production without resorting to chemical inputs.

Two hectares of the ecofarm are dedicated to agroforestry crops. Trees enrich the soil by restoring nutrients deep in the soil. Before the establishment of crops, the ground is being notably prepared thanks to the contributions of organic waste and compost produced by PAPREC Agro.

Some 500 fruit and forest trees have been selected and planted on these agroforestry plots with the idea of preserving a local forest heritage that is adapted to both the climate and the soil. Large and medium-sized crops also produce 12 tonnes of vegetables and 1 tonne of cereals per year.

To restore and safeguard the wetland that is in the pasture plot, PAPREC Agro has set up a low density pasture to maintain the biodiversity of the site without human action, with Highland Cattle cows.

The site also welcomes the public and many pupils from schools from the region.

www.paprec-agro.com

InVivo Wine, also created by InVivo, is a major player in the international wine sector. InVivo Wine offers wine growers a range of tools and solutions to implement sustainable farming practices for products which are better valued by the market today. Based in different wine-growing regions (Bordeaux, Rhône, South-West, Languedoc, Roussillon, Beaujolais), InVivo Wine cooperatives bring together nearly 3,600 winemakers cultivating 25,000 hectares of vineyards.

Invivo Wine: Viticulture with living soil for Château Maris

Invivo Wine is implementing several innovative initiatives to mitigate the impacts of climate change and envision the vineyard of tomorrow. Château Maris—the first vineyard in the Minervois AOC to be fully certified biodynamic—is an example of putting this into practice.

Château Maris covers 45 hectares of land, divided into a multitude of plots on the hillside above La Livinière. It received Ecocert certification in 2002, then Biodyvin in 2004 and Demeter in 2008.

Biodynamic viticulture is a constant reminder that life plays a role in all its forms and that we must endeavour to care for it and understand it every day. The soils and living organisms that make up and surround the vineyard form a complex ecosystem that influences the quality and flavours of the grapes. Biodiversity has been enriched at several levels in the vineyard as a result of this dynamic.

First of all, through agroforestry, over 200 linear metres of hedges have been planted between plots since 2011 (270 linear meters as of 2020). These hedges not only help improve the local ecosystem but also help preserve habitats and species. A biodiversity diagnosis was also launched in June 2020 to obtain precise recommendations for conserving, restoring and developing the biodiversity of the vineyard, paying special attention to invasive species.

The vineyard, which is operated without applying any pesticides or other chemicals, also relies on cover crops planted between the rows. In total, the Château Maris estate has 30 hectares of vines with rows alternating between faba beans and a mixture of ten varieties (oats, rye, purple vetch, hairy vetch, Asian radish, Egyptian clover, crimson clover, brown mustard, Phacelia and flax).

The faba bean is a legume that will be rolled to avoid tillage for two years. The mixtures will be destroyed in the spring and buried to feed the soil. This has plenty of advantages, including a very high biomass production with an input of stable organic matter that degrades slowly, maximum root exploration that activates soil life without ploughing, and lastly a continuous soil cover until the spring.

To ramp things up in scale, InVivo Wine and Château Maris have developed the "Maris" offer, based on the same environmental requirements as Château Maris. The offer is sourced from five cooperatives to organise the supply of sustainable wines in terms of volume and quality. In two years, they hope to go from 0 to 750,000 bottles of certified organic wine.

Organic vineyard in Languedoc

Demand from end-users is an essential factor in scaling up sustainable farming practices. What these examples do show is that scaling up is feasible both technically and organizationally.

2.4. Sustainably managing forests from a biodiversity standpoint

The ecosystem value of forests is undisputed and needs no proof. According to the FAO[42], based on a report published in 2018, rainforests play a significant economic and social role, with more than 800 million people living in tropical areas and over 2 billion depending on them. From an ecosystem perspective, rainforests are a remarkable tool for action: 75 % of the world's accessible freshwater comes from forested watersheds, and the rainforest has a CO_2 absorption capacity of 2 billion tonnes of carbon per year[43]. If properly managed, these ecosystems would contribute to the targeted carbon neutrality[44].

Yet, despite these benefits, the rainforest is ill-treated and is undergoing massive overexploitation, tantamount to deforestation, as space observations confirm.

Solutions do exist, however, and a number of businesses are committed to a zero-deforestation target in 2020. But this only scratches the surface, as standards and labels focus on a mere handful of sectors, including RSPO for palm oil, FSC and PEFC certification for forests and plots.

Combating deforestation only within the confines of a forestry concession does not account for the continuity of forest spaces, nor for ecological corridors, and even less for the other pressures supported by a territory.

The determination to scale up requires a territory-wide approach that reflects the diversity of a geographical area, of natural ecosystems, and of human communities, and involves all stakeholders, be they civil society, local and national governments, or companies operating in the field.

To be functional and sustainable, the territorial approach must also reach out to downstream players, including supply chain buyers and product managers. The French Forest Conservation Alliance (APF) is committed to meeting this expectation. It has participated in the development of the French National Strategy to Combat Imported Deforestation (SNDI) and made a number of recommendations, such as the setting up of a tripartite observatory, the establishment of a development fund for producer countries, the strengthening of transparency efforts and the sharing of best practices.

Beyond these efforts to reduce the pressure on rainforests, major French farmers are also taking steps to ensure that French forests are managed not only for wood and carbon absorption, but also for other features, including biodiversity.

Société Forestière
GROUPE CAISSE DES DÉPÔTS

Acting for the future of forests

As a responsible and committed business, Société Forestière has developed with its customers and partners a new service offering that respects forest multifunctionality and, in particular, places a value on ecosystem services by giving priority to biodiversity protection and production. The offering is backed by various sustainable forestry operations and allows forest owners to measure the state of biodiversity in their holdings, to set specific targets for a given strategy and, lastly, to monitor their actions.

The following options are available:
1. Reducing and avoiding the impacts of forestry operations on land; and **2.** Producing biodiversity by creating small ageing islands, keeping habitat trees and dead wood on the ground, creating reserved areas for integrated biodiversity conservation, and developing on a vast, nationwide scale corridors for the free movement of species (green and blue belt networks).

Société Forestière has joined the "Entreprises Engagées pour la Nature/act4nature France" initiative and made operational commitments covering all its activities on the 225,000 hectares of forests under its discretionary management. Already, there are specific programmes to protect and restore natural habitats in the most relevant holdings conducted jointly with recognized local partners.

It also carries out actions in partnership with CDC Biodiversity in order to identify forest biodiversity monitoring indicators.

42 http://www.fao.org/3/ca0188fr/ca0188fr.pdf
43 Compared to about 15 billion tonnes of carbon emitted by greenhouse gases (50 billion teqCO2).
44 See in this connection the recommendations of the ZEN 2050 study. http://www.epe-asso.org/en/zen-2050-imagining-and-building-a-carbon-neutral-france-july-2019/

Another way to enrich industrial forestry with biodiversity is to multiply crops in some rubber tree and even palm oil tree plantations. Above all, this would provide income diversification for farmers as well as production security, since greater diversity of cultivated species would strengthen the ecosystem's resistance to shocks[45]. The actions of Michelin Group to promote sustainable rubber tree cultivation are relevant in this respect and could serve as an example for other crop types.

Recreating favorable conditions for biodiversity

Natural rubber is a sustainable, infinitely renewable raw material that creates wealth and rural employment. Nevertheless, the increasing global demand for natural rubber and poor agricultural practices can have negative consequences for tropical forests and biodiversity. This is why Michelin has been working in the field for many years to recreate conditions favorable to biodiversity.

Through its network of natural rubber assets in particular, the company is carrying out concrete actions: in Brazil, with the Michelin Or Vert Bahia Program, in Thailand and Indonesia with the Royal Lestari Utama project (RLU) and in West Africa (SIPH).

In 2015, Michelin and its Indonesian partner Barito Pacific, in partnership with WWF, launched the Rubber Plantations and Forest Conservation Program, which aims to protect primary forests – in Jambi (Sumatra) covering 66,000 hectares and in East Kalimantan (Borneo) covering 22,000 hectares, totaling an area of 88,000 hectares devastated in the past by an uncontrolled deforestation – to restore areas where there has been significant loss of biodiversity, to establish ecological corridors along rivers and to transform unproductive and degraded areas into productive areas, through the development of sustainable rubber plantations.
On about 40% of these areas (34,000 hectares), rubber trees will be planted to produce natural rubber, which will create 16,000 direct and indirect local jobs and provide income for the local population. The rest of the concession is devoted to the development of agroforestry with food crops and forest restoration.

The entire project provides for rangers to protect thousands of hectares of tropical forest with high environmental value as well as to protect several species of fauna and flora threatened with extinction[46]. In Jambi, rubber plantations will create a buffer zone south of Bukit Tigapuluh National Park, protecting it from the threat of encroachment.

At the end of 2019, 10 million rubber trees had been planted in the region, while 1,234 different native species have been planted and 7,108 seedlings are growing in nurseries to continue forest restoration[47].

45 See agroforestry applied to examples of soybeans and cacao and analysed in The contribution of sustainable trade to the conservation of natural capital: The effects of certifying tropical resource production on public and private benefits of ecosystem Services, PBL Netherlands Environmental Assessment Agency, 2016

46 Five species at critical risk of extinction: Elephant (Elephas maximus sumatranus), Tiger (Panthera tigris sumatrae), Orangutan (Pongo Pygmaeus morio), Black-casqued Hornbill (Rhinoplax vigil), Shorea faguetiana (Shorea peltata). Four endangered species: Black-crested Sumatran Langur (Presbytis melalophos), Asian Wild Dog (Cuon alpinus), Sunda Otter Civet (Cynogale bennettii), Asian Tapir (Tapirus indicus).

47 Source: RLU ESG Annual Report 2019

3 Renaturing artificialised areas and cultivating heterogeneity

What is more unexpected than a waste-storage facility to regenerate biodiversity? The Séché Environnement site at Changé (53) illustrates what a long-term policy can achieve, even in an activity that has a rather poor public image.

The Séché example introduces the idea that even highly artificialised areas, cities, industrial sites and infrastructure can re-emerge as bearers of biodiversity. Business has a role to play here, and many corporates are doing exactly that, usually in conjunction with local authorities and civil society – the two key managers of urban spaces.

Séché

Restoration initiatives to promote habitat variety and biodiversity

Since its beginnings, the long-standing Séché site located in Changé, north-west France, has given great thought to both the landscape and biodiversity by encouraging diverse species. In-depth knowledge of the local context enabled the company to draw up a landscape master plan in 1993.

In order to be eco-compatible with the surrounding landscapes and gradually restore exploited areas, Séché began an initiative to create new host environments including microhabitats. The idea of an ecological corridor quickly established itself as a way to protect and link ecologically sensitive areas (ESAs). The success of the restoration programmes is very much dependent on the protection of these ESAs, which serve as refuges for fauna as well as migration corridors.

High and low hedges have been planted in combination with preserved mixed-species hedgerows, together with layered hedges consisting of different varieties of endemic plants. The diversity of the planted species also increases resilience to climate change, as certain plants have a greater ability to adapt.

The pollarded trees typically seen in the wooded countryside of the area are another source of biodiversity and have also been preserved, along with some clusters of very old trees. Sown plants are combined with annuals, perennials and grasses, with preference given to local and nectar-producing species.

Expanses of open pasture and scrubland areas also attract specific fauna.

Wetlands have been reinstated and others created to form a succession of around thirty ponds. The diversity of these pond habitats and their different forms are helping to increase the variety of species associated with wetland environments. Amphibians are particularly well represented, and include mountain, webbed, crested, marbled and hybrid newts.

In order to maintain these diverse habitats, differentiated management and eco-grazing are enabling them to remain open.

The Group's ecologists and associations within the area are working together to monitor and protect this local biodiversity. Since 1993, this cooperation has helped Séché better understand and preserve the dynamic of living species on its industrial site and, since 2015, its ECOCERT "Commitment to Biodiversity" certification has enabled it to integrate and develop its best restoration practices.

3.1. Reintroducing nature into towns

Numerous examples of this phenomenon exist in both new builds (see Icade above) and existing urban sites. The limits of biodiversity in cities are also better known today, and businesses have moved beyond the point where they relied on beehives to protect bees on their roofs.

Le réseau de transport d'électricité

Supporting and fostering biodiversity in urban areas

Green spaces in urban areas host rich and specific forms of biodiversity, thereby maintaining ecological connectivity is essential to ensure properly functioning ecosystems. Aware of this reality, RTE – with nearly 80% of its tertiary buildings located in urban and peri-urban areas – takes this biodiversity into account and carries out infrastructure improvements that protect and foster its development.

Since 2017, RTE has been working alongside Noé[48], an association for nature conservation, in order to implement an integrated system supporting biodiversity in the green spaces of its tertiary sites. Within the scope of this partnership, Noé carries out a diagnosis of the ecological potential of the sites and makes proposals taking into account local environmental issues, in consultation with employees. Once the facilities are able to accommodate biodiversity, the sites are granted the "Jardins de Noé" label. In order to ensure the sustainability of these new spaces, Noé also helps RTE and its contractors to define appropriate maintenance strategies including alternative methods to phytosanitary products, their usage has been prohibited on tertiary sites since late 2018.

When planting vegetation on these sites, RTE prefers the "Végétal local"[49] label or equivalent, ensuring the local origin of plant species used. Particular attention is paid to pollinating insects for which special habitats are created such as flowering meadows and the planting of melliferous species.

One of the key success factor behind this initiative is the active employees' involvement. Awareness-raising events are held, particularly during the Fête de la Nature, to explain the role of these landscaped features and to change the workers' perception. They get involved in the building of nest boxes and insect hotels, as well as in the laying-out of community gardens, plantations, etc. RTE also encourages its workforce to assess the effectiveness of these measures by taking part in interactive citizen science.

In addition to the "Jardins de Noé" label, some of RTE's tertiary sites have been granted "Refuge LPO"[50] and "BiodiverCity"[51] labels. RTE is also committed to develop green spaces of all its new sites or of sites undergoing major rehabilitation work.

Collaborative gardens on the Head office's rooftop in La Défense © Déborah Lesage

48 http://noe.org
49 https://www.vegetal-local.fr
50 https://refuges.lpo.fr
51 http://cibi-biodivercity.com/biodivercity/

3.2. Redesigning quarries and industrial sites as sustainable natural spaces

An unprecedented and ambitious solution to reintroduce nature into urban areas is Saint-Gobain's project to plant a multi-species urban forest on a landlocked industrial site in an urban area, without impinging on the food needs of the various populations.

SAINT-GOBAIN

Creation of an urban forest in India

Worldwide leader for Habitat, Saint-Gobain designs and provides innovative and high performance solutions that improve our living places and our daily life. Saint-Gobain has set itself the ambition of preserving, restoring, increasing and enhancing biodiversity, and managing to involve concerned parties.

Based on its experience in its 150 gypsum and sand quarries, operated and then restored with the aim of preserving the environment, the Group today has significant internal expertise on biodiversity. It is now a question of extending it to our industrial facilities and distribution outlets.

A good example of development in the industry took place at our Saint-Gobain's flat glass production site in Chennai, India, that was internally awarded for its project of urban forest creation.

In 2016, the Glass Chennai complex was 72 Hectares with a built up area of 29 Hectares. The rapid development of industrial buildings in the complex necessitated the need for a better management of ecology.

To reduce the direct pressures of industrial activity on the biodiversity, the Chennai plant created a dense forest (3 trees per sqm) with 86,000 trees which consists of 42 native species and various medicinal, flowering and fruit bearing trees. The plan is to reach 100,000 trees planted by the year 2020. Local community was involved in the plantation work.

The urban forest, which does not encroach on the vital needs of the surrounding population, plays an important role in ecology in many ways: it attracts birds, creates a barrier against noise, slowing also wind and storm water, reduces the ground temperature and increases the water table.

Views of the urban forest at Saint-Gobain's Chennai site

According to UNICEM, quarries are an opportunity for biodiversity, especially as many of the old ones have become ecologically rich areas[52]. The industries in this sector have been familiar for some thirty years with biodiversity issues and have been factoring them in from the operating project design phase, through impact studies and day-to-day management, to site redevelopment.
Regulatory constraints have ensured that quarry operations take nature into account.

Scientific studies conducted by the quarrying industry with the scientific community over more than twenty years have revealed the wealth of ecological assets at these sites. Endangered species find refuge in quarries which offer them rare natural environments, such as ponds, wetlands, gravel pits, and rocks. The actions to regain biodiversity can be reproduced at all industrial sites, as exemplified by Imerys and LafargeHolcim below.

IMERYS
TRANSFORM TO PERFORM

An integrated approach to ecological quarry rehabilitation

Quarrying is a temporary process whose potential impact on quarry sites can be redressed through rehabilitation at the end of each site's service life. Ecological rehabilitation involves restoring functional habitats by enhancing the site's environmental assets compared to its original condition.

Imerys supports its quarrying operations in that process by deploying a variety of biodiversity management tools as early as the project stage and throughout the quarry's life cycle. As its primary protocol for all of its sites worldwide, Imerys defines the minimal requirements that govern how biological diversity is to be preserved. Those standards come with a set of tools that provide a thorough understanding of the steps to be taken in order to meet the Group's internal requirements and embark on a virtuous process of continuous improvement. Those tools, intended for site managers, clearly explain activities and strategies for ensuring an effective ecological rehabilitation. They describe how to reduce the risk of propagating invasive alien species, restore and reconnect habitat areas, include all stakeholders in the preservation of biodiversity during the life cycle of the quarry, revegetate sites in ways that foster biodiversity, and so on.

Imerys assesses and measures its progress using a biodiversity maturity matrix that each site can use to begin a virtuous circle of continuous improvement by proposing new steps to be taken each year.

© L Alain

Through PatriNat (Natural Heritage), a teaching/research partnership sponsored by the French government, France's National Museum of Natural History (MNHN) is lending support to Imerys throughout this initiative, providing world-class scientific knowledge and practical advice on developing and enhancing those tools.
In addition, Imerys firmly believes that rehabilitating sites so they can be integrated into the surrounding region is essential. For that reason, it is developing a research program with the MNHN to improve the deployment of the mitigation hierarchy: avoid, minimise, offset approach at the regional level. That program, which was tested at a multi-quarry site in France, is designed to be deployed at other sites to help integrate them into the region and ensure they offer lasting, sustainable value for everyone.

52 http://www.unicem.fr/2020/06/22/eviter-reduire-compenser-un-guide-de-reference-pour-proteger-la-biodiversite/

LafargeHolcim

A collaborative approach to manage biodiversity

Committed for several decades to highlight the natural heritage of its sites, LafargeHolcim has developed a collaborative multi-stakeholder approach for the management of biodiversity. Example with the gravel pit of Saint-Ouen-sur-Loire, in the Nièvre (58).

A quarry is a temporary activity, a parenthesis or a stage in the life of a soil. While its opening can lead to disturbance for a given habitat, the pioneer environments formed during operation and the environments recreated during rehabilitation can host significant biodiversity. In order to support its teams on these issues throughout the operation of the quarry, LafargeHolcim has implemented a "Quarry rehabilitation and biodiversity" directive applicable to all of its sites, as well as a biodiversity toolbox. The directive provides for the systematic implementation of a rehabilitation plan, drawn up in consultation with our stakeholders, a real keystone of governing space.

Saint-Ouen-sur-Loire gravel pit is located in the alluvial plain of the Loire Nivernaise. The habitats listed there are particular and unique: they are composed of a mosaic of dry, acidiphilic lawns and an oak-charmaie-elm grove (Quercus sp., Carpinus sp., Ulmus sp.) On fescue lawn (Festuca sp.). The objective of the rehabilitation was therefore to restore and keep in good working order the acidiphilic lawns endemic to the banks of the Loire. To ensure the consistency of the rehabilitation plan with the operation, a biodiversity action plan was drawn up in 2016 for a period of twelve years.

To lead this project, LafargeHolcim called on several partners: the Conservatory of Natural Areas of Burgundy (CNAB) is supporting the project management and part of the work is carried out by a farmer. Four years after its implementation, the first results are encouraging: on the one hand, there is strong support from all the partners and, on the other hand, positive results in the areas where the work has been carried out.

The lessons learned from this project provide a basis for feedback, accessible to all employees, and allowing the sharing and dissemination of good practices.

The sustainability of renatured spaces at quarries is, however, contingent upon the interest shown by other public or private stakeholders (owners) at the end of the quarry operator liability period.

3.3. Planning green corridors for linear and non-linear infrastructure

After decades of managing only direct impacts, primarily as part of regulatory compliance, some businesses have become experts in biodiversity, with linear infrastructure being gradually transformed into green belts.

Open spaces: boosting the ecological potential of railway rights-of-way

Result of a reflection combining security and infrastructure maintenance issues with adjacent nature stakes to be taken into account, SNCF-Réseau is deploying an upgrading policy whose goal is to develop a mosaic of predominantly grassland habitats around the tracks.

These major landscape transformations are intended to reinforce the place of a declining habitat, permanent grasslands, and consequently, to limit large wild fauna presence in the immediate vicinity of tracks (see above). Identified as the habitat the most relevant to answer to the constraints of an industrial management of vegetation in a railway context, permanent grassland also suffer from strong pressures due to the combined effects of urbanization and intensification of agricultural practices (tillage and use of agrochemicals and pesticides).

Located between mineral surfaces (tracks and paths) and shrub or forest habitats at right-of-way limit, the permanent meadow, mechanically maintained, constitutes a most attractive ecotone for many species (plants, insects, reptiles, birds and little mammals), especially for open-country specialized insects and birds for which heavy losses have been observed – around half of their number over the last 30 years[53].

With 88 000 hectares of green outbuildings mostly crossing rural and agricultural areas, strengthening the place of permanent meadows on the network's rights-of-way thus seems to be an interesting avenue. Over an average width of 14m, numerous plots bordering railway tracks can intermittently host herds of varying sizes, whose controlled management contributes to the ecological maintenance of these spaces and represents a proven opportunity for local economy (grazing, forage harvest).

RTE's management of rights of way with a view to transforming them into ecological corridors is an example of the large-scale rollout of new, biodiversity-friendly actions based on the involvement of all employees and external stakeholders, as well as the valuation of land as a natural asset. Several complementary methods have been used to factor in the expectations of the various stakeholders in the search for an inclusive and sustainable project:

1/ initial mapping;
2/ analysis of local opportunities;
3/ meeting with owners and managers;
4/ conclusion of tripartite agreements;
5/ construction site management;
6/ long-term management.

These stages refer to the maturity scale described in the introduction to this publication.

53 See studies CEBC CNRS/INRA, 2018 and CESCO MNHN, 2018.

Le réseau de transport d'électricité

Reinventing our practices

How to make change the internal company's procedures in order to modify industrial practices for the benefit of biodiversity and the regions? That is the whole challenge behind changing scale. With 20 000 km of power lines in forested areas, RTE – who is responsible for the safe transmission of electricity – has a duty to closely monitor cohabitation between high-voltage lines and forest vegetation, located on land that it does not own. In order to do this, the most common practice is rotary flail, a technique that can disturb fauna and flora. After trying out alternative and innovative biodiversity-friendly methods together with its Belgian counterpart Elia from 2011 to 2017, and supported by the European LIFE programme, RTE set up the BELIVE project (a French acronym for Fostering biodiversity underneath power lines through alternative methods).

As an operational R&D project, BELIVE is seeking to determine the human and financial resources needed to gradually implement an alternative method for managing vegetation underneath power lines over a surface area of 200 hectares by late 2020.

BELIVE is being run on a pre-industrial scale in three pilot areas: the Ardennes Regional Natural Park, recognised by the French State as a pilot site for biodiversity; the "West" region and the "Mediterranean" region. Within each of these areas, operational coordinators liaise with a wide range of stakeholders (hunting federations, permanent centres for environment initiatives, regional natural parks, natural space managers, local associations, owners, local farmers and livestock breeders) in order to implement measures that will help maintain low-lying vegetation underneath power lines. This project will be extended from 2021 to include the company's seven regions: the aim of this first large-scale phase is to convert 210 hectares a year into alternative vegetation management and reach a target of 2300 hectares by 2024.

A great challenge for biodiversity!

Alternative forest trench management in the Regional Natural Park of Ardennes
© Lisa Garnier

Most of the industrial sites operated by EDF – power plants, dams, wind farms, etc. – are located in or close to natural areas, and they have an impact on nearby fauna and flora.

EDF does not want to limit itself to a defensive approach that focuses solely on reducing the impacts of its industrial activities on ecosystems.

Proactive land management to boost biodiversity

With many of its industrial sites located closed to protected areas, EDF Group has long been committed to protecting biodiversity, which features as one of its six corporate responsibility goals, which seeks to "launch a positive approach to biodiversity, not limited to knowing or reducing the impacts of our activities, to have a positive effect on biodiversity."

In France's Isère department, EDF has preserved a wetland at the Saint-Alban Saint-Maurice nuclear power plant. In 2012, as part of a proactive approach termed "Land and Biodiversity" initiated by its Nuclear Engineering arm, ecologists identified the Malessard wetland located within the site perimeter as a wetland zone of high ecological value.
In 2018, this led to the signature of a partnership with the Isère nature conservancy agency that would see efforts made to restore heavily degraded ecosystems covering 20 hectares. The first stage, completed in 2019, has already improved hydraulic efficiency in the zone, one of the keys to a healthy wetland.
In April 2020, a new 5-year management plan for Malessard was agreed with the nature conservancy agency, which drafted the plan in consultation with the EDF delegation for the Rhone-Mediterranean basin.

The plan calls for greater efforts to count and record wildlife such as beavers, amphibians and dragonflies, and a new series of actions starting in 2020. These will include digging ponds to shelter amphibians, managing invasive non-native species and switching to grazing instead of mowing in the medium term.

4 Experimenting with Nature-based Solutions

Nature-based Solutions (NbS) are defined by IUCN as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity[54] benefits".

Indeed, healthy, resilient, functional and diversified ecosystems provide many ecosystem services, thereby facilitating solutions that benefit our societies and biodiversity and help combat climate change, manage natural risks, improve health, and provide access to water and food security[55].

54 IUCN, 2016. Motion 77: definition of Nature-based Solutions. https://portals.iucn.org/congress/fr/motion/077
55 IUCN French Committee, Les Solutions fondées sur la Nature pour lutter contre les changements climatiques et réduire les risques naturels en France, 2018.

IUCN divides NbSs into three types of action that can be combined in a territory[56]:

- conserving ecosystem function and maintaining good ecological status;
- improving ecosystem management for sustainable use by human activities;
- restoring degraded ecosystems or creating new ecosystems.

IUCN French Committee

Rolling out Nature-based Solutions to meet the challenges facing our societies

Several studies have demonstrated the economic value of various Nature-based Solutions. For example, coastal wetlands prevented more than $625 million in property damage during Hurricane Sandy, and reduced property damage by an average of 16% in New Jersey[57]. Another study conducted in the US Gulf of Mexico shows that Nature-based Solutions could be an economical method to avoid more than $50 billion in climate change-related costs at a benefit-cost ratio in excess of 3.5[58].

Today, solutions to reduce natural risks are no longer limited to civil engineering schemes, but include programmes to leverage the services provided by ecosystems. For example, Nature-based Solutions have the potential to limit natural, water-related risks (floods, erosion, landslides, mudflows, droughts), which are one of the most significant risks in France[59].

Unlike many forms of grey infrastructure, these solutions bring many benefits, including biodiversity gains and task-specific problem solving (landscape, well-being, socio-economic effects, etc.). They offer a "win-win" situation by delivering cost-effective and sustainable outcomes.

Some businesses have already adopted these initiatives, although they need to be more widely rolled out and shared. Backed by case studies, the IUCN French Committee seeks to encourage such initiatives, and to demonstrate how Nature-based Solutions can be factored into global corporate strategy and can help meet corporate goals and commitments as well as the needs of biodiversity conservation.

© Suez

56 IUCN French Committee, Les Solutions fondées sur la Nature pour les risques liés à l'eau en France, 2020.
57 S. Narayan, M.W. Beck, P. Wilson et al., The Value of Coastal Wetlands for Flood damage Reduction in the Northeastern USA. Scientific Reports, 2017 (7: 9643.
58 B.G. Reguero, M.W. Beck, D.N. Bresch, J. Calil, and I. Meliane. Comparing the cost-effectiveness of Nature-based and Coastal Adaptation: A case Study from the Gulf Coast of the United States. Plos one, 11 April 2018.
59 https://uicn.fr/wp-content/uploads/2020/01/sfn-light-ok.pdf

CDC BIODIVERSITÉ

Nature 2050, contributing to the adaptation of territories to climate change through Nature-based Solutions (NBS)

Launched in 2016, the Nature 2050[60] program aims to support and monitor NBS implementation projects over the long term to adapt French territories to climate change and mitigate this change. The program's action targets are biodiversity in cities, wetlands, agricultural and forest transitions, ecological continuities, and marine and coastal ecosystems. At the end of 2019, the Nature 2050 program was supporting 34 projects in France, supported by local actors (local authorities, associations, managers of natural areas, etc.). With the support of the Steering Committee's members (ADEME, the French Office for Biodiversity, EcoMaires, France Nature Environnement, the Nicolas Hulot Foundation for Nature and Humanity, LPO France, the French Museum of Natural History and the Scientific Committee of CDC Biodiversity represented by Luc Abbadie, Professor of Ecology at Paris-Sorbonne University), CDC Biodiversity and the project leaders have defined indicators to assess and enhance the impact of projects on biodiversity, the resilience of ecosystems in the face of climate change and the contribution of territorial actors to actions.

The Nature 2050 program is based on the voluntary commitment of economic actors, at national and local scales.

For € 5 excluding taxes paid to the Nature 2050 program, CDC Biodiversité undertakes to restore, adapt and monitor 1m² of biodiversity until 2050. Since the program launch, 40 contributors have joined the initiative, contributing approximately € 4.5 million. So many actors who wish to participate in a collective approach, strengthen their commitments to the climate and biodiversity, as well as their territorial anchoring in order to contribute to the environmental improvement, the living conditions and well-being (employees, customers, elected officials, etc.). Since the program launch, the Caisse des Dépôts group has provided specific support to Nature 2050. Several subsidiaries such as Icade, Transdev, La Poste, Compagnie des Alpes, CDC Habitat and Ipsec have largely contributed to amount of more than € 2.9 million to the Nature 2050 program.

© National Natural Reserve, " baie de l'Aiguillon "

60 https://www.nature2050.com

The conjunction of pollutant emissions from human activities and climate change is fuelling growing concern over water resources. The creation of vegetated discharge areas (VDAs) based on natural wetlands can help improve the resilience of the natural environment by leveraging the water purification services delivered by ecosystems. However, their effectiveness is debatable.

Without specific design rules and with often-underestimated operating costs, the expected benefits of conventional VDAs have neither been consistently achieved nor maintained. Following years of research and development in ecological engineering, VDAs have ultimately been improved.

Protecting biodiversity thanks to Zone Libellule®

Resulting of a unique engineering developed by SUEZ, the Zone Libellule® completes the conventional treatment of wastewater treatment plant (WWTP) based on the purification capacity of nature. It is an artificial wetland that can be placed downstream of a WWTP in which the development of biodiversity allows the increased fight against micropollutants and limit their diffusion in water sweet or marine.

The Zone Libellule® is made up of a set of water basins, of varying morphologies and sizes, vegetated by specifically selected local species for each area. Treated wastewater which circulate in these basins are purified by the combination of biological actions (biodegradation by microfauna, collection by plants) and physical (degradation by the sun or settling). This is the succession of various wetlands, where speeds of flow and water depths are different, which makes it possible to mobilize the different degradation or absorption mechanisms of pollutants and therefore to adapt the treatment to the objectives of each site.

Five years of research led by CIRSEE, principal Suez research and expertise center, in the framework of the **ZHART project** (2012-2016), made it possible to finalize the concept of Zone Libellule® whose dimensioning adapts to macro processing objectives and micropollutants targeted and in the local context.

Unlike other VDAs, the Zone Libellule® is a way to achieve quantified objectives in hydraulic regulation, micropollutants treatment and ecological benefit.

The concept has been deployed at several sites in France and exported to China. SUEZ NWS won in 2017 a design contract for ecological requalification of **the wetlands of Shanghai industrial park (SCIP)**. This is the largest zone creation project group using the Zone Libellule® concept and covering approximately 50 hectares. The project aims to rehabilitate the existing network of wetlands to improve wastewater treatment.

The development of Nature-based Solutions often falls by the wayside because of the absence of a viable private business model – without government intervention – working in conjunction with what are still emerging private markets.

Since July 2020, an international standard developed by IUCN - the IUCN Global Standard for Nature-based Solutions - provides a global framework for the development of such initiatives[61]. This standard will help stakeholders, including business, to take greater ownership of the concept by establishing operational criteria and indicators. Business will henceforth have the opportunity to experiment and implement effective nature-based solutions.

61 IUCN Global Standard for Nature-based Solutions: First Edition (https://portals.iucn.org/library/node/49070).

CHAPTER 3

Factoring nature into business decisions

The previous two chapters identified solutions that are not yet widespread but could be scaled up and mainstreamed. In this final chapter we identify transversal drivers that are useful, indeed essential, for spurring corporate action on a larger scale. These drivers are gradually opening up an entirely new economic system based on technical tools and financial solutions that factor biodiversity into the decisions of economic, industrial and financial stakeholders, whether or not they have only an indirect relationship to nature. "As concerns over nature degradation grow, the roles and responsibilities of financial institutions are increasingly seen as a lever for mobilizing business around this crucial issue and switching financial flows from environmentally-harmful activities to environment-friendly ones[62]".

This has encouraged the emergence of solutions that, although remote from the grassroots, are powerful and promising as they are much more systemic.

In a report prepared for the European Commission in 2009, Pavan Sukhdev estimates that the cost of inaction between 2000 and 2050 would amount to €50 billion annually for land ecosystems alone[63]. Consequently, biodiversity erosion entails significant risks and costs for business due to the deterioration of the ecosystem services companies are used to benefit from.

According to the OECD's most comprehensive global estimate, ecosystem services deliver benefits amounting from $125 billion to $140 billion a year[64]. Ecosystems are approaching critical thresholds and tipping points which, if breached, will result in persistent and irreversible changes to those services. It is therefore in the interests of business and investors to factor in biodiversity as a creator of opportunities and risks. A similar view is expressed by a recent WEF report, which argues that 400 million jobs could be created through nature-friendly actions, generating an economic value of about $10 billion[65].

For businesses with little or no direct impact on biodiversity, or decision-makers far away from the field, the question is how to get their employees, at all levels including senior management, to factor biodiversity into their analyses and decisions.

Despite growing awareness of global risks, spurred by the Covid-19 crisis, it is often difficult for a business to define its footprint on biodiversity, let alone a goal to amend this footprint. In keeping with the broadly shared willingness to stop biodiversity erosion, neutrality targets are convenient to adopt as a theoretical object of study, but difficult to implement in practice and articulate with the company's business model. Discussing targets can, however, help us address the issue of measurement tools, understand the appropriateness of a particular action, define priorities based on the materiality of issues and corporate environmental impacts, and even determine a pathway. How to proceed from here so that the whole company signs up to this initiative?

Luc Abbadie makes a short recommendation to business leaders – "cultivate heterogeneity" – one which more often than not leaves them feeling bemused. Since corporate culture mostly applies the very opposite principles (standardisation to reduce costs and risks, optimisation through calculation, simplification to go faster or make widespread), how does one turn this call to action into a general principle for action?
The box opposite provides an explanation.

62 WWF France and AXA. Into the Wild. Intégrer la nature dans les stratégies d'investissement, Recommendations by WWF France and AXA to G7 Environment members, Metz, 5-6 May 2019.
63 TEEB. The Economics of Ecosystems and Biodiversity – Business Report – Executive Summary 2010.
64 OECD. Biodiversity: Finance and the Economic and Business Case for Action, report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019, http://www.oecd.org/environment/resources/biodiversity/Resume-et-Synthese-Rapport-G7-financer-la-biodiversite-agir-pour-l'economie-et%20les-entreprises.pdf
65 https://www.weforum.org/reports/new-nature-economy-report-ii-the-future-of-nature-and-business

Luc Abbadie

The living world can only be changing and heterogeneous

Diversification is a fundamental property of the living world. Its beginnings date back more than 3.5 billion years when various types of metabolism already coexisted. This much is clear from molecular phylogenetic data on the tree of life whose reconstitution seems to show its branches spreading ever more. This much is equally clear from palaeontological data, which shows that after every period of mass extinction, new species appear and new lines develop, usually according to an exponential and apparently unstoppable dynamic. As a result, there are eight to ten million species today. This number could grow in the future, unless it is reduced by a major planetary accident which would not prevent life from starting again millions or tens of millions of years from now.

The motor of this inventiveness is the heterogeneity and instability of genetic information. While two individuals belonging to the same species share the same genes, small differences in structure (which allow a gene to exist in the form of multiple alleles), and the conditions for expression of certain genes, constitute a primary source of individual-to-individual variability. Some alleles, especially in small populations, may be lost over time as a result of accidents of reproduction. Genetic drift, therefore, can cause two groups of individuals belonging to the same species not to be completely similar in morphology, behaviour or physiology.

Over the longer term, during evolution mutations or purely accidental heritable or environmentally-generated genetic modifications (e.g. those produced by ultraviolet rays) alter one or more traits of an individual.

If those alterations are neutral or environment-friendly, they could spread to the wider population, which then differs from its previous state. If they are reinforced by further alterations, they could lead to the development of a new species. This is natural selection at work. A new trait is selected when it provides a reproductive advantage. So, under the principle of compromise, if an organism puts all its energy into sweating to fight heat, or in search of food consumed by others, then it has fewer resources with which to reproduce. However, if mutations gradually lead to the appearance of thermal insulators, such as fur, or if the organism specialises in smaller, less coveted prey, then it can invest more in its reproduction and its descent is ensured!
Just as the environment changes from place to place, so prey, pests, competitors and symbionts change randomly or in response, through natural selection, to changes in predators, hosts, competitors, and symbionts. Nothing is ever definitive. The beneficial traits of the past become the disadvantageous traits of the moment. Of course, ever smaller resource-sharing is always an option.

In short, the living world can only be changing and heterogeneous. It is heterogeneous because it responds to its own heterogeneity, and its heterogeneity ensures its ability to maintain itself, come what may.

The ten common act4nature commitments are the outcome of collective thinking on what needs to change in business to make its activity more nature friendly. The commitments draw on the practical experience of many companies and NGOs who have sought to cover the widest possible field.

Twenty partners[66], in consultation with EpE member companies within the act4nature Steering Committee, set out the following common commitments at the launch of the act4nature alliance in 2018.

It is only fitting that we use this process and this ten common commitments to describe management solutions identified by businesses to scale up their actions for nature.

66 http://www.act4nature.com/wp-content/uploads/2018/07/BROCHURE_act4nature.pdf
and http://www.act4nature.com/wp-content/uploads/2020/11/act4nature_international_commit_en-1.pdf

act4nature PARTNERS IN 2018

Business network

Public organisation

Scientists partners

Environmental NGOs

1. Integrating biodiversity into our corporate strategy, founding our action on available scientific knowledge;
2. Engaging in dialogue with all our stakeholders regarding their expectations and our impacts, actions and progress;
3. Assessing the various components of biodiversity of concern to us, using direct and indirect impact indicators, risk and performance indicators and, when relevant for decision making purposes,assessing in economic terms our impacts and our reliance on smoothly functioning ecosystems;
4. Promoting the progressive integration of biological diversity into decisions throughout our value chains, from the production of natural raw materials to the final stage of our products life cycle after use by consumers;
5. Primarily preventing, reducing and ultimately offsetting our impacts, by seeking on a case-by-case basis no net loss as a bottom line and even a net gain of biodiversity in our activities and geographical areas of influence, and by factoring in the need for ecosystems to adapt to climate change;
6. Giving priority to the development of Nature-based Solutions, ensuring that they are implemented in a science-based and biodiversity-friendly manner, and promoting a certain variety in such solutions;
7. Incorporating biodiversity into our dialogue with policymakers so that this issue is progressively embedded into public policies. When invited to do so, contributing to the national biodiversity strategies of countries where we operate;
8. Raising awareness of and train our employees in biodiversity and its relation to their jobs. Promoting and encouraging nature-friendly initiatives by them and providing due recognition to such actions and practices;
9. Mobilising resources and establishing appropriate partnerships to support and monitor our actions taken in the field;
10. Publicly reporting on the implementation of these commitments and of our individual commitments set out below.

1 Factoring biodiversity into corporate strategy and relying on the science

The first common commitment derives directly from what has been done for the climate. Corporate action is all the more effective if the issue is built into business strategy, or indeed becomes the driving force behind it. Reliance on science is even more relevant than in the case of climate change because biodiversity is multidimensional.
Nature sciences accordingly face new challenges, not least of which is fielding questions from businesses on how their activities interface with nature. For example, how can an asset portfolio be managed to support biodiversity? Can agriculture be altered to conserve biodiversity and still satisfy other uses and remain profitable? Is it possible to shape farmers' business models so that it is in their interest to change their practices? At what pace can these transitions be made? Which stakeholders need to be involved? How can their economic viability be ensured?

Beyond questions of science lie questions of strategy. Once this knowledge is reported to boards and shareholders, the issues they raise have to be addressed. Should we discard certain activities and invent others? Which models should we use? There is no getting away from the fact that biodiversity should shape corporate strategy.

The following two examples show how these questions and considerations help to innovate and create new business models and activities, and contrariwise how they might lead to the exclusion of other models.

LE PRINTEMPS DES TERRES

Financing the ecological transition of agriculture

Printemps des Terres, a social purpose corporation, grants financing to farmers to implement ecological transition. This solution uses land as a lever for action because it is the main factor in farm production and a focal point for environmental issues. In the face of the ongoing ecological transition, the two main challenges of agriculture are the shift in consumer demand toward organic products and environment-friendly practices, and the development of new services from farmlands and forests, such as renewable energy production, carbon sequestration, biodiversity conservation and water quality.

Printemps des Terres seeks to address these challenges through an original scheme whereby it acquires and leases land from farmers undergoing transition, in partnership with agricultural institutions, under rural leases. It thus frees its tenants from the burden of financing the land and their farm's ecological transition, while granting them the resources to be stakeholders and beneficiaries of that transition.

It moreover funds the ecological development of the plots, collaborating with farmers on crop change, ecological restoration, carbon sequestration, agrivoltaics, and so on. Tenants may also purchase those plots whenever they wish after a five-year period.

The financing requirements of farmers and loggers to address societal and environmental issues are considerable. Alongside the land leverage solutions offered by Printemps des Terres, there are other essential approaches, such as the use of science and technology to better harness the new ecological transition technologies (e.g. agrivoltaics, permaculture, carbon capture in soil), and the development of improved organizational and commercial systems (distribution channels, consumer-producer links, etc.). All these solutions require funding. The good news is that the markets are ready to provide the finance as well as a return on the corresponding investment.

Contact: **Contact@printempsdesterres.fr**

Voluntary Exclusion Zones Natural sites included on the UNESCO World Heritage List & Arctic Sea Ice area

Aware of the need to protect the nature on which humanity depends, Total ensures that biodiversity is taken into account in all of its activities. This ambition materialized in 2005 by the Group's biodiversity policy. For several years, the Group has made commitments to voluntarily exclude certain exploration and production (E&P) activities in areas of particular sensitivity, i.e. natural areas of the UNESCO world heritage and the Arctic sea ice area; for the latter area, Total is the only major oil company to have made such a commitment. These commitments were confirmed in 2018 when the CEO of Total signed the act4nature initiative in favor of biodiversity; they were reinforced in 2020 as part of the Group's 2030 ambition in terms of biodiversity, during the global preparation of the United Nations Biodiversity Plan.

Thus:

1. Total does not conduct oil and gas exploration or extraction activities at natural sites included on the UNESCO World Heritage List at December 31, 2019[67] (i.e. voluntary exclusion zones representing 3.6 million km^2). An internal Atlas describing these sites is updated annually and distributed internally.

2. Total does not carry out any exploration activity for oil fields in arctic sea ice[68]. A map showing the Group's licenses in the Arctic sea ice zone is published and updated every year[69].

See: **http://www.act4nature.com/en/committed-companies/**

Creating an activity is taking a risk, whereas excluding an activity is reducing risk but also activity. Between the two, all manner of intermediate solutions are possible depending on the company's perception of the materiality and urgency of the issue.

2 Holding discussions with stakeholders

A large number of studies point out that the interface between a business and its physical and social environment is crucial to biodiversity. Through high-quality dialogue with its internal, external, international, national and local stakeholders, an organization can improve understanding of its actions and foster constructive and transparent discussion. There are many opportunities to initiate a stakeholder commitment process. For several years, businesses have been developing tools to map, exchange and include such discussion in their strategy and operations[70]. Biodiversity is a fit topic for discussion, as illustrated by the many nature contests in various communities, outdoor site visits and/or in-house training schemes, all of which help to foster positive and objective dialogue.

To scale up biodiversity actions, the local dimension is all important. Biodiversity in business often starts at local level, influences strategy at central level, and resurges at local level. This process entails regular discussions with neighbouring populations in order to enhance understanding of local stakeholder expectations, facilitate the exchange of ideas and information and report on the community's biodiversity-related needs. The following case studies illustrate the in-house work done by companies to promote ongoing dialogue on biodiversity issues with stakeholders interested in the company's activities.

67 The reference date is updated annually after verification between July 31 of the current year and January 31 of the following year. In the event of a posteriori geographic interaction, i.e. when a site enters the UNESCO heritage inventory after an exploration-production license is issued, the interaction is publicly declared.

68 The selected area is the average extent of the pack ice, reference: National Snow and Ice Data Center (USA) Sea Ice Polar Stereographic North, maximum extent from 1979 to 2019 and then updated.

69 https://www.sustainable-performance.total.com/sites/g/files/wompnd1016/f/atoms/files/total_licences_in_arctic_april_2019.pdf

70 For an example of environmental health, see http://www.epe-asso.org/en/factoring-in-environmental-health-issues-facing-businesses-october-2019/

Ciments Calcia
HEIDELBERGCEMENT Group

Quarry Life Award, a competition to encourage biodiversity

The Quarry Life Award is a scientific and educational competition offered by HeidelbergCement and its subsidiaries around the world. With regard to the various quarries in France, this three-year competition aims to raise awareness of the preservation and conservation of biodiversity at extraction sites, and to share best practices for the protection of flora and fauna.

The Quarry Life Award allows scientific organizations, NGOs, schools, volunteers, with the exception of HeidelbergCement employees, to put forward a project that will be carried out in a quarry. Projects must showcase biodiversity from an educational or scientific perspective.

Several projects have been carried out since the start of the competition, focusing on the knowledge of native species in quarries, water management, redevelopment, invasive exotic flora, etc. Thus, in the Meuse, a fishing federation has redeveloped a connection channel between the existing river and the quarry, creating a valley where pike can now come to spawn in a sheltered area. This project received an international award in 2018. On the site of Saint-Germain d'Arcé, in Sarthe, volunteers have carried out an inventory of moths for a whole season and, in the process, discovered the area with the highest number of nocturnal lepidoptera. This project received the first prize of the Quarry Life Award 2018 in France. In Aquitaine, a participatory science programme entitled "Un dragon dans mon jardin?" (Is there a dragon in my garden?) received the second prize.

The Quarry Life Award provides a unique opportunity to incorporate genuine ecological and educational values into quarrying, as well as to contribute to global nature conservation goals by raising awareness of the importance of biodiversity. This competition also allows participating sites to create links with new stakeholders.

The role of stakeholders is, of course, to provide insights into the local natural environment and related issues. It is also to participate in some long-term decisions to ensure that the choices made are consistent with their vision of the territory's future. This is particularly true of quarries and their planned use after redevelopment, but the same can be said for a host of other issues, including solidarity, sector development, and local governance, to name but a few.

3 Assessing and evaluating biodiversity - a multi-faceted issue

All EpE members know that in business measuring is managing. Many signals emanating from the economic and financial community point to the need for reliable and adequate measuring instruments, whether physical or monetary, to enable informed discussion and assessment of the actions undertaken. Thanks to the efforts of all parties, today better account is taken of biodiversity in the non-financial decisions and reporting of French corporates. Indeed, there is no shortage of indicators on biodiversity. France's National Biodiversity Observatory has 94 indicators to measure and analyse the state of biodiversity in the country. During Natural Capital Week in November 2018, more than 120 biodiversity assessment and management methodologies were presented. Many physical databases exist and can be used by companies. The example below shows that the oil company Total has adopted a management tool applicable to all its marine operations.

Marine Local Ecological Footprinting Tool (LEFT) Decision support tool for activities in the marine environment

Marine LEFT is a decision support tool with an ergonomic interface, used by TOTAL for a rapid screening of biodiversity issues for its projects and sites. It complements the Group's biodiversity decision-making tools. The tool offers a complete "one stop shop" device in terms of access to georeferenced biophysical, societal and economic activity data on a study area, with a complete and referenced report. The tool was developed in open access at https://www.marineleft.ox.ac.uk, in accordance with Total's biodiversity commitment n ° 5, made as part of the act4nature initiative. Marine LEFT was developed on the conceptual basis of the LEFT module dedicated to terrestrial environments; it is the result of collaboration with the ecology laboratory at the University of Oxford and the oil & gas peer company Equinor. Total contributes to the maintenance of the tool to make it sustainable. All the data come from recognized sources (WDPA, FAO, OBIS, GBIF, etc.) and benefit from strict quality control. The tool can help reduce the effort, costs and time of some field campaigns, and also helps in assessing the risks associated with acquisitions.

The tool provides information on many parameters:

- **Biodiversity:** survey data, species richness of some taxa, endangered species richness, marine vertebrate migration routes and Critical Habitats [World Bank Performance Standard 6].
- **Ecosystem services:** commercial fisheries, mitigation of natural risks by coastal ecosystems (modeled).
- **Threats:** Rising sea level, ocean acidification, temperature trend, coral bleaching, invasive species.
- **Environmental uses:** maritime traffic, fishing, wind farms and aquaculture areas.
- **General maritime data, functional processes and environmental data:** global marine ecoregions (WWF), benthic mapping, etc

For several reasons, though, it is difficult to assess with one and the same tool the direct and indirect impacts of all businesses on biodiversity. For a start, biodiversity involves multiple species and habitats, so it would be like comparing apples and oranges. Unlike climate, there is no single indicator for measuring biodiversity. Furthermore, most of the phenomena observed are multi-factor and the problem of matching cause to consequence is practically insoluble. Also, business models and supply chains vary widely across sectors, making causal relationships variable.

It is thus up to each business or stakeholder to choose dedicated pilot indicators for each decision, and to renounce altogether a universal metric for all biodiversity goals, as recommended by Arcadis' expert Johan Lammerant in his assessment in late 2019 of twelve business biodiversity footprint measurement methodologies[71] on behalf of the Business@Biodiversity Platform. His conclusion "that you do not manage living beings like tonnes of carbon" aptly sums up the issue. Accordingly, business responses can hardly be lumped together and even less boiled down into a universal metric, as the RSE[72] platform also confirms.

This, however, does not preclude the search for answers in response to the specific needs of many stakeholders. Non-financial analysts know how to ask corporates relevant questions, and will award a biodiversity rating to them summarising corresponding risks and strategies. Two projects - one by "Task force for Nature-related Financial Disclosure[73]", and the other on EU taxonomy for factoring in biodiversity[74] - enable investors to assess the impacts and risks of their portfolios and to enhance them seamlessly. Debates about science-based targets relevant to biodiversity will also provide benchmarks for each issue, provided one remains aware of their relative value. For example, the WCMC tool that modelled the planet and its biodiversity using a 30 km by 30 km grid has allowed the Chinese government to draw and create its green belt (known as red-lining)[75].

71 https://ec.europa.eu/environment/biodiversity/business/assets/pdf/European_B@B_platform_report_biodiversity_assessment_2019_FINAL_5Dec2019.pdf
72 https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/fs-rse-avis-empreinte-biodiversite-entreprises-mars-2020_0.pdf
73 https://www.responsible-investor.com/articles/market-players-and-uk-government-to-launch-tcfd-for-nature#.Xxcew2Ipls4.linkedin
74 https://data.consilium.europa.eu/doc/document/ST-14970-2019-ADD-1/en/pdf
75 https://trondheimconference.org/assets/Files/TC9%20Presentations/02_Ma-KP-Trondheim-C-S6-201907030.pdf

In another field of activity, Imerys, in partnership with MNHN, has built a biodiversity-specific maturity scale to track the progress of the group's biodiversity strategy at each site and internationally, and how this performance is reported to stakeholders.

Each site is encouraged to focus on seven topics that are subdivided into actions to be undertaken:

a. Management
b. Knowledge and information on natural background
c. Mitigation and land claim
d. Monitoring
e. Training and awareness
f. Communication
g. Partnerships

Each site is assessed on a maturity scale of 1 to 4. This assessment, coordinated by the group's environment management, is not disclosed but incorporated into internal audits. The methodology measures and drives awareness and gradual adoption of the biodiversity approach. It can clearly only be used by certain companies facing the same problem.

Many experts believe that, in order to conserve biodiversity, we must develop multiple measurement tools in order to avoid favouring one dimension over another. Establishing a parallel with health is heuristic. "No need to define a state of good health to fight disease", Yann Laurans notes aptly. Different methods are useful to assess different tools. Some indicators can be used as tags or benchmarks rather than as formal activity assessment and rating tools[76].

The diversity of tools alone is not enough to respond to the expectations of the financial community, whose opinion plays an important role in getting corporates to change their business model, and whose demand for unified tools to account for and value issues and actions along the lines of carbon values in climate action is growing.

The World Economic Forum's[77] Global Risks Report 2020 points out that it is in the interests of business to factor the "value of nature" into their risk and impact mapping. However, existing tools do not yet permit comparable monitoring of biodiversity-related financial issues for all countries and businesses. This is one of the reasons behind the recent appeal to the business community by thirty investors, with over €6,000 billion worth of funds under management, for a concerted effort to develop transparent biodiversity-related impact metrics[78].

The examples of Caisse des Dépôts below demonstrate that multiple methods can coexist to meet the needs of investors.

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76 https://www.afbiodiversite.fr/sites/default/files/PDF/Colloque/FBE/FBE2_P9_Stratégie_Synthèse.pdf
77 https://www.weforum.org/reports/the-global-risks-report-2020. In 2015, biodiversity loss was ranked 10th in the same report.
78 https://www.mirova.com/sites/default/files/2020-05/CP_Les%20investisseurs%20se%20mobilisent%20en%20faveur%20de%20la%20biodiversité_2805_VF.pdf

Three ways of integrating biodiversity preservation issues in its activity as an institutional investor

First of all, the subsidiary CDC Biodiversité has developed a tool for measuring the biodiversity footprint of economic activities throughout their value chain: the "Global Biodiversity Score". This tool was designed with many experts and stakeholders, and has been subjected to a critical review coordinated by the OFB (French Office for Biodiversity). Several pilots and assessments have already been carried out in partnership with companies and investors as part of the B4B + club. A 1.0 version was presented in May 2020 and will be used more and more widely with the ambition of reducing the biodiversity footprint of Caisse des Dépôts' assets.

Secondly, before investing in a company, the Caisse des Dépôts's asset managers examine a series of environmental criteria (use of raw materials, land use, degradation of fragile ecosystems, water stress, supply chain, carbon footprint of products, etc.) from data provided by independent third parties. These impacts are then integrated into the valuation that is made of the company to inform the investment decision. Criteria for preserving biodiversity are also incorporated into the selection of specific asset classes such as real estate assets (by promoting environmental labeling, combating the use of phytosanitary products in gardens, etc.) or forest assets (specific eco-certified sustainable management practices promoting biodiversity for assets managed by Société Forestière). The exclusion of certain assets in activities that are both harmful to the climate and whose associated extraction activity causes impacts on the destruction of ecosystems, is also practiced.

Finally, Caisse des Dépôts makes full use of its shareholder position to encourage large companies to reduce their impacts. Since 2019, a shareholder dialogue has thus been initiated with several companies in the agri-food sector on the theme of deforestation and Caisse des Dépôts voted in favor of 18 environmental resolutions at general meetings of shareholders. These notably ask companies to report on their use of pesticides, the impact of their value chains on deforestation, their management of food waste or the reduction of plastic pollution and the promotion of responsible packaging.

4 Promoting biodiversity in decisions along value chains

The fourth common commitment by all businesses engaged in act4nature concerns the gradual factoring of biodiversity into decisions along the value chain, both upstream and downstream. This reflects the need to mobilise corporates on their indirect impacts where they have the power to act, but in a way which avoids reducing their footprint by simply passing the burden on to other players. For a business, it means taking this issue into account from product design, purchasing and finance all the way up to customer relations.

4.1. Ecodesigning products for a positive footprint

Eco-design has both economic and environmental benefits. New products factoring in biodiversity can establish a competitive edge among consumers increasingly sensitive to environmental issues. This implies redesigning product composition from R&D to production systems, and from marketing to communication, as illustrated by Solvay and L'Oréal. Failure to do so would mean that "businesses may be caught off guard and miss opportunities to benefit from the new sources of revenue associated with ecosystem changes[79]".

79 Évaluation des services rendus par les écosystèmes aux entreprises. Guide pratique pour l'identification des risques et opportunités issus de l'évolution des écosystèmes, p. 4.

The researcher Harold Levrel, however, notes that "businesses cannot be expected to identify overnight new opportunities that lead them to invest heavily in biodiversity conservation", in the absence of stricter government regulation against products and services harmful to biodiversity[80]. Be that as it may, regulatory risk is another strong incentive to anticipate and innovate.

SOLVAY commits to reducing its pressure on Biodiversity by 30% by 2030

Solvay is committed to Biodiversity. Solvay ONE PLANET, the Group's roadmap towards Sustainable Development, was launched in February 2020. Biodiversity is addressed through the 3 pillars of the roadmap: Climate, Resources and 'Better Life'.

To this end, Solvay identifies, measures and manages the biodiversity challenges associated with its supplies and with the direct footprint of its manufacturing processes, i.e. its pressures on the value chain.

The Group has in fact developed an indicator of the pressures it exerts on biodiversity through all of its products. The pressures on biodiversity are the different ways in which our activities can affect the environment and the organisms living in it: climate change, soil acidification, land use, etc. Fifteen or so different pressures, each individually quantifiable, can be distinguished.

Taking the environmental profiles of its products as basis and examining their life cycle, Solvay was able to identify and measure the pressures on which its product portfolio has the greatest impact (this process is also applied to products under development). After several months of work, Solvay was able to demonstrate that the pressures representing 90% of its impacts on ecosystems are climate change, freshwater eutrophication, marine eco-toxicity and soil acidification, and to develop a specific action plan to reduce these pressures by 30% by 2030.

On October 2020, Solvay's commitment on biodiversity was recognised by act4nature international coalition (**https://www.solvay.com/en/press-release/solvay-receives-recognition-on-biodiversity-commitments**). Solvay also joined the B4B+ (Business for Biodiversity+) working group set up by the Caisse des Dépôts et Consignations, and actively contributes, through pilot projects, to the co-construction and testing of the Global Biodiversity Score, which aims to implement an internationally recognized biodiversity impact indicator.

Solvay thus confirms its ambition to contribute to resolving the main environmental and societal challenges of our planet through science and innovation, in line with the Group's reason for being, which is to bond people, ideas and elements to reinvent progress.

More details on Solvay's ambitions:
https://www.solvay.com/en/sustainability

80 FRB, D'une économie de la biodiversité à une économie de la conservation de la biodiversité, op. cit. https://www.fondationbiodiversite.fr/ wp-content/uploads/2020/06/03-06-2020-Opinion-Economie-biodiversite.pdf

L'ORÉAL

Ecodesigned products that respect planetary boundaries

Since 2017, the group L'Oréal has been taking into account planetary boundaries when designing and renovating its products, thanks to its eco-design tool SPOT (for "Sustainable Product Optimization Tool"). Developed with the support of a panel of independent scientific experts, SPOT is based on the lifecycle analysis of cosmetic products and assessed their social and environmental performance. As such, SPOT takes into account 14 impact factors, such as biodiversity, measured at every stage of a product's lifecycle: production of ingredients for the formula, production of packaging, manufacturing, consumer use, recycling, etc. These impact factors are then aggregated to achieve a coherent global score that can be used by teams, and weighted according to planetary boundaries. In 2020, based on the assessment of these impacts, the group L'Oréal began to display the environmental and social profile of certain Garnier products in France to help consumers make more sustainable consumption choices.
In addition to the overall environmental impact score, which classifies products on a scale from A to E, this new labelling system includes two specific indicators corresponding to the main impacts of a cosmetic product on the environment: their carbon footprint and their water footprint (the latter indicator looks at the impact on both the quantity and the quality of water). In addition to this information, consumers can find details about the manufacturing conditions and packaging profile of products. The labelling also displays key information regarding a product's social impact, including the number of suppliers committed to social inclusion and having contributed to the product.

4.2. Purchasing and supply management

Businesses can adversely affect biodiversity and ecosystem services through their supply chains. Thanks to the Environmental Profit and Loss Account (EP&L), the luxury group Kering has prepared multi-year estimates of the impact of its activities on the environment (air pollution, water pollution, GHG emissions, water consumption, waste, land use)[81]; more specifically the impact of land use by its supply chain amounted to 32% of total impacts, or some €170 million in 2018.
The group uses this tool to set targets for reducing its footprint, and now applies rigorous standards to all its suppliers.

© Kering

81 https://keringcorporate.dam.kering.com/m/6b254da158b2d217/original/Kering-Biodiversity-Strategy.pdf

KERING

Kering Standards for sustainable sourcing

Kering is committed to reducing its environmental footprint by 40% by 2025. For the Luxury Group's activity, more than 90% of environmental impacts take place in the supply chain. Biodiversity loss through land use is the second most significant impact after climate change. Indeed, specific to Luxury, the Kering Houses mainly use natural raw materials, such as silk, cashmere, wool or leather, which often come from sensitive ecosystems. In order to ensure the quality and sustainable supply of these raw materials, Luxury Houses should play a role in protecting these ecosystems.

This notion is operationalized in practical terms for Kering's buyers and suppliers through the Kering Standards for Raw Materials and Manufacturing Processes. Established in collaboration with internal and external experts, the Standards have been validated by all the CEOs of the Kering Houses, who are committed to aligning 100% of their sourcing with these standards by 2025. For each of the twenty key raw materials, the Standards detail the challenges and requirements in terms of traceability, social welfare and environmental excellence. Where they exist, the Standards refer to the most rigorous environmental certifications (GOTS for cotton, Fairmined for gold, etc.) and, where no such certifications exist, the Standards outline fundamental principles and needed due diligence. At the end of 2019, Kering's raw material sourcing was 74% aligned with these Standards.

As an industry first, Kering publicized these Standards in 2018 in order to facilitate wider industry adoption. The Standards are reviewed annually to ensure they continue to incorporate best available science and industry practices. In 2019, these Standards were fortified through the addition of the Kering Standards on Animal Welfare, which were also made public in order to advance practices in the fashion industry.

4.3. Biodiversity and funding

While the financial sector has only a small direct impact on nature, it has a sizeable indirect impact through the investments it makes, the loans it grants, and the insurance policies it offers. "Sustainability Linked Loans" directly encourage biodiversity-related corporate goals, through bespoke financing at a subsidised rate, provided the set targets are met. This new financial instrument, barely known in 2017, should attract more and more sectors if the selected indicators are transparent and SMART[82], as BNP Paribas and Séché Environnement have shown. Whether the initiative comes from the funder or the funded, this practice could be usefully mainstreamed.

82 Understood as specific, measurable, attainable, relevant and time-bound.
See http://www.act4nature.com/wp-content/uploads/2021/02/Definition-SMART_EN.pdf

Séché — Positive incentive credit and biodiversity

At the centre of ecological transition issues, green finance provides mechanisms allowing businesses to fund their growth in a sustainable way by attracting interest from socially responsible investors (SRIs). In addition to purely financial considerations, this type of funding commitment also takes account of Environmental, Social and Governance (ESG) criteria.
With a view to reconciling funding with sustainable development, Séché Environnement chose to take out a positive incentive loan amounting to €270 m to refinance a portion of its bank debt. This green loan incorporates innovative ESG criteria, including a biodiversity criterion: a "first" in France in 2018.

Committed to a socially responsible approach, Séché Environnement chose to include a number of environmental impact criteria in its credit agreement, based on objectives taken from its sustainable development strategy:

- commitment to the preservation of biodiversity with the development of a programme of concrete actions. The annual objective relates to the progress made in terms of actions outlined in the act4nature initiative;

- energy efficiency policy, by achieving a certain rate of energy self-sufficiency;

- an exceptional level of Environmental, Social and Governance (ESG) performance.
On this last point, Séché Environnement has appointed the extra-financial rating body EthiFinance to attest to its performance level.

Séché Environnement expects to benefit from lower interest rates throughout the four-year loan period, provided that it meets the objectives set in relation to these criteria, objectives that have already been met in the first two years. To confirm that it has achieved its goals, the Group has asked its external auditors to carry out an assessment of its environmental criteria.

With an even wider application than Séché, BNP Paribas has developed a similar agreement with the Finnish forestry and paper company UPM.

BNP PARIBAS — A loan for UPM, a forest-based company, with pricing mechanism linked to biodiversity

BNP Paribas supports its clients in their actions aimed at preserving biodiversity, in particular by offering specific financial services.

BNP Paribas acted as Sustainability Coordinator for a "Sustainability Linked Loan" (SLL) of 750 M€ for the Finnish forest-based company UPM. With an SLL, the interest paid by the borrower depends on the achievement of targets linked to sustainability: the interest rates are lower if the Company achieves its targets, and higher if it does not.

UPM's SLL is one of the first to rely on indicators linked to biodiversity. The interest rate on the loan is tied to two key performance indicators, one of which is linked to the preservation of biodiversity: the objective is to achieve a net positive impact on biodiversity in UPM's Finnish forests.

Achieving this goal is based on indicators developed by UPM, which follow in particular tree species, age and structure of the forest, protected areas, valuable habitats, habitat restoration and species and habitat projects.

4.4. Mobilising players from within the sphere of influence of the company

Winning local stakeholders over to the company's biodiversity drive is another lever to build biodiversity into corporate decision-making. This will lead two worlds to coalesce, i.e. vertically organised supply chains and horizontally organised territories.

storengy
Une société de ENGIE

How to move from a simple service to a partnership open to stakeholders

Based on the observation that the classic Facility Management model (maintenance services for green spaces, cleaning and security) was not intended to place ecology at the heart of its activities, Storengy decided to create a new concept, ECO-FM (Ecological Facility Management), which responds to a double paradigm: no longer considering the preservation of biodiversity only as a constraint and costs but as an opportunity to create value; no longer consider its 14 French industrial sites, covering around 1,500 hectares, as an isolated archipelago of the territory but as so many links that can contribute, with the help of local players, to strengthening ecological continuity.

Effective since early 2018, ECO-FM constitutes a global instrument for managing the general aspects of biodiversity responding to the environmental, social, energy and economic challenges of the company. It involves the management of green spaces but also, more broadly, of the company's land properties, which can contribute to the efficient regulation of environmental problems in the territory.

The Biodiversity Committees, chaired by the operator, constitute the steering body of the ECO-FM contract. They bring together all the players involved in the ecological management of green spaces: operators, service providers and stakeholders. These are represented by land managers (Conservatories of natural spaces, ONF, CRPF etc.), LPO associations, CPIE etc.) and local ecologists who actively participate in discussions and decision-making.
ECO-FM is part of Storengy's voluntary commitment to the National Strategy for Biodiversity (2015-218), included in July 2018 in act4nature and today in EEN-act4nature-France. Storengy has surrounded itself with major national partners, including the IUCN French Committee, the MNHN and the LPO, to define and implement its policy in favor of biodiversity.

© Denis Leca, Storengy

4.5. Mobilising customers

When a company has the means to foster dialogue with customers, this can prove particularly effective.

MARSH

Securing the redevelopment of industrial sites and preserving natural soil

In the field of risk analysis and insurance brokerage, Marsh has developed both, expertise and specific insurance, to secure the redevelopment of former industrial sites. The aim is to facilitate and secure the reuse of built ground and thus avoid concreting of natural soil.

Integrating an environmental counter-expertise in the process of redeveloping an industrial site for a more sensible use, like housing, reduces the risk of errors and omissions. Involving an insurer as an independent stakeholder, accepting the risk of residual pollution that may remain despite all caution taken within the transformation process, secures all stakeholders.

The insurance will as well indemnify property damage and bodily injury of future site occupants as additional clean-up of soil and groundwater if necessary. The cover will even include demolition and reconstruction of real estate if residual pollution can't be treated otherwise. The policy grants adverse effects on a long term, up to 10 years.

Marsh has developed these risk advisory and insurance services to assist promoters and other players of the sector to accept the residual risks inherent to the transformation of the use of soil. The preservation of natural areas, by reusing already artificialized soil within development projects, is measured in m^2 of secured soil. We took as a reference base the first half of 2020 with 40,000 m^2 secured by redevelopment. The aim will be to secure a total of 160,000 m^2 by the end of 2021, 380,000 m^2 by the end of 2023 and 600,000 m^2 by the end of 2025.

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NATIXIS

Engaging dialogue with our clients to develop financing solutions dedicated to natural capital

Natixis recognizes the essential role of biodiversity to preserve ecosystem balance, and that of the financial sector in the necessary ecological transition of human activities.

Natixis has made several commitments to safeguard biodiversity and natural capital across its various business lines, including Corporate & Investment Banking. Working groups have been implemented to set the bases of a dialogue with its clients on biodiversity.

Natixis is committed to systematically engaging the dialogue on biodiversity and natural capital, with all its clients to whom sustainable finance solutions are proposed. Natixis is also committed to do at least 5 deals per year, in 2020 and 2021, integrating specific objectives to protect or restore natural capital.

Natixis has already accompanied some of its clients in this approach, for example the Ghana Cocoa Board.

Natixis has co-arranged this $300 million sustainable term loan. This facility will finance production improvement programs and includes a margin adjustment mechanism based on environmental and social goals. One of the goals is the promotion of sustainable agricultural practice (training in these practices, planting of shade trees). This deal is one of the first in this sector to encourage environmentally friendly production techniques.

© AdobeStock

5 Avoiding, reducing and ultimately offsetting the impacts of business

The mitigation hierarchy has already been widely discussed in the first chapter on pressure reduction. The best way to preserve natural environments is to focus, first and foremost, on avoiding those impacts.

It is nevertheless worth mentioning that, as for climate, offsetting tools are starting to be developed. This is illustrated by two impact funds focusing on biodiversity issues.

Developing impact funds dedicated to natural capital: example of the Land Degradation Neutrality of Mirova

Since 2017, Mirova, affiliate of Natixis dedicated to sustainable investment, has used an investment platform specialized in preserving biodiversity and natural capital, and develops innovative investment solutions to mitigate and adapt to climate change, and to protect biodiversity, soils and marine resources.

In response to the depletion of natural capital and land degradation as global issues (relating to food security, human life and ecosystems), the Land Degradation Neutrality (LDN) Fund is an example of the type of innovative public-private partnerships needed to finance the SDGs. The Fund was created by the United Nations[83] and Mirova as a source of transformative capital bringing together public and private investors to fund triple bottom line (economic, social and financial) projects that contribute to neutrality in terms of land degradation. The LDN Fund invests in sustainable agriculture, sustainable forestry, and other projects such as green infrastructure or ecotourism.

By addressing land degradation, the LDN Fund delivers the following benefits:

- land degradation neutrality;
- climate change mitigation and adaptation;
- improved livelihoods and biodiversity.

The LDN Fund continued to raise funds throughout 2019, with commitments totaling $150 million out of a target of $300 million.

After financing its first project in Peru — to provide agroforestry systems for small coffee producers — three new land restoration projects have been proposed by Natixis and its partners: in Bhutan, Indonesia and Kenya, involving 30,000 small farmers, with the aim of restoring over 45,000 hectares of degraded land and capturing nearly 2 million tons of CO_2.

Natural capital: first investment of the LDN Fund in Peru
© Ecoterria

83 United Nations Convention to Combat Desertification (UNCCD).

Although similar to the previous one, the L'Oréal Nature Regeneration Fund is another good example of an innovative financial product dedicated to environmental issues and generating a return on investment.

L'ORÉAL The "L'Oréal Fund for Nature Regeneration"

As part of its program "L'Oréal for the Future", and beyond efforts to reduce its footprint on biodiversity across its entire value chain, L'Oréal wants to help repair damaged natural ecosystems. To help tackle this problem, the group is creating a 50 million euros impact investing fund that will simultaneously generate positive social and environmental impacts as well as economic returns with a single purpose: to support projects restoring degraded marine and terrestrial habitats. More specifically, the portfolio will include projects that support the restoration of degraded land, the regeneration of mangroves as well as the restoration of marine areas and forests.

Beyond ecological restoration, these projects will also help address the social needs of surrounding communities through the development of sustainable livelihood opportunities (sustainable agriculture and fisheries, ecotourism, commercialization of carbon credits).
They will live in a healthier environment, enjoy new economic opportunities and enhanced resilience to climate change.

6 The example of biomimicry

We have already presented Nature-based-Solutions in Chapter 2. However, biomimicry is a special technique that has produced concrete and significant value-creating applications.

Biodiversity is a huge source of inspiration and potential innovation. Mimicking the workings of nature and developing sustainable innovations in that field are an age-old approach which gained rapid momentum in the late '90s[84]. According to the National Strategy for Ecological Transition to Sustainable Development 2015-2020, biomimicry "consists in seeking inspiration for sustainable innovation in nature, where we find both effective and resilient strategies for synthesising and degrading materials, settling down or moving about, storing or distributing energy, processing information, organising networks and exchanges, and much more besides".

Biomimicry draws inspiration from the processes of living beings and applies them to man-made structures, while respecting the ecosystems in which those structures are built. The world of living beings saves material and energy and can channel vast amounts of information. In the agricultural sector, understanding interactions between species has improved cultivation techniques. Tomorrow, it may help us to invent new economic, industrial and organizational models.

84 https://biomimexpo.com/les-accelerateurs-de-biomimetisme/

Le réseau de transport d'électricité

Reconciling technology and living beings to support regeneration of natural and human ecosystems

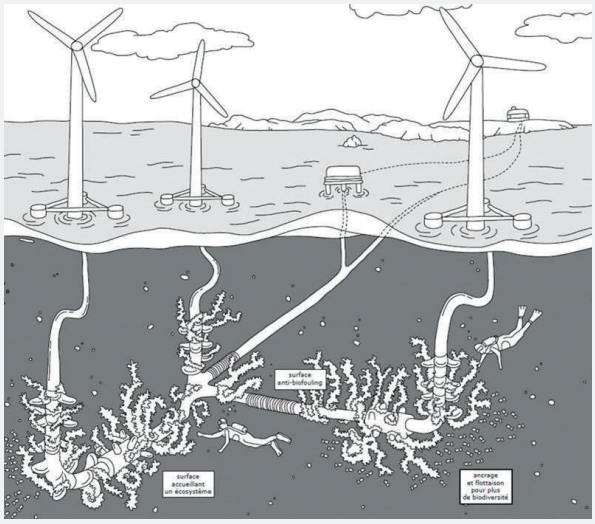
Biomimicry is a systemic approach to ecodesign solutions. It represents a fertile gateway that creates a link between life sciences, design and engineering, a new link to be reinvented between the techno-sphere and the biosphere. Accordingly, RTE uses biomimicry as a way of innovation both by and for living beings. As an actor in the energy transition, how can we find the best way of designing a power system that integrates massive renewable energies?

In order to establish a strategy for adapting the grid to energy and ecological transition needs, RTE used the example of the primary forest by implementing two basic principles of life science: the exchange of information and cooperation. This sober adaptation strategy of the electrical grid results in 7 billion euros of savings and the equivalent value of materials, resources and emissions, either saved or avoided.

The biomimetic adventure began in 2015 when RTE joined CEEBIOS (European Centre of excellence in biomimetics) in France. In 2017, as part of a study into the effects of maintaining and operating submarine power cables in partnership with TBM Environnement, RTE adopted a resolutely biomimetic approach by exploring the role of the scallop, Pecten maximus, as a bio-indicator.

RTE is now exploring the full potential of biomimicry for the connection of renewable marine energy sources. A first R&D project has been set up to study the biomimetic potential of floating wind-farm cable connectors.

At the same time, offshore connection platforms are being set up to develop their multi-functionality: shared benefits and regeneration for natural and human ecosystems.
An adventure that will gain momentum in the coming years!



Marine lifeline

7 Incorporating biodiversity into dialogue with policy makers

Business may find a variety of reasons to factor biodiversity into negotiations with public authorities. For many manufacturers, the issue features in discussions when operating permits are issued, and is therefore treated with due care. Several EpE members, including quarry and site operators, have informed us they are drafting stricter provisions in their operating permits than the minimum required by law, so as to perpetuate the nature-friendly choices they have made on a voluntary basis.

Discussion with local authorities is essential as corporate actions have to be adapted to local social and environmental contexts. Local authorities are the most knowledgeable about their local environment and its future prospects. Their duty to represent the population leads them to reflect the priority given by citizens to biodiversity, both in their discussions with business and in their other decisions. By placing the issue on the corporate agenda, business can also boost people's awareness and action in that area.

At both national and local level, public authorities are buyers and, in principle, customers sensitive to this issue. They can finance and assist actions, or grant aid subject to clearly defined biodiversity criteria. Lastly, they oversee the competitive framework within which businesses operate, and can, through biodiversity and climate regulations, promote more environment-friendly practices in Europe and around the world, although such activities are governed by free-trade agreements[85].

The issue is significant, with 30% of global threats to species directly linked to international trade. Europe, the world's largest importer of agricultural and forestry products, accounts for 12% of global deforestation, with 7% of deforestation being crop-related[86]. Stricter regulation of the issue, along the lines being considered for the climate, would be a powerful driver for biodiversity worldwide.

BUSINESS FOR NATURE

Creating positive policy ambition. Why the fight against nature loss is increasingly becoming a business priority

The science is clear. Social and economic prosperity will only be possible on a healthy planet. Businesses are increasingly acting to mitigate risk and seize opportunities to invest in nature – over 530 businesses have already made ambitious and timebound commitments, and over 1,200 companies are acting to protect and restore nature.

But businesses cannot solve these challenges in isolation, and political leadership is key to spurring more business action. Ambitious and transformative policies are needed to mitigate climate change, promote sustainable growth and halt the decline of biodiversity. In turn, these policies will help create a level playing field so that all businesses are required to do their part to safeguard nature for future generations.

This is why Business for Nature, a global coalition that brings together business and conservation organizations and forward-thinking companies, actively works to amplify a powerful leading business voice calling for governments to adopt policies now to reverse nature loss this decade. This is demonstrated by the "Nature is Everyone's Business" Call to Action through which over 700 companies, across over 50 countries and representing USD 4.3 trillion in combined annual revenue, are calling for governments to act now.

Through Business for Nature, forward-thinking businesses are actively contributing to the negotiations at the 15th Conference of Parties (COP15) of the Convention on Biological Diversity (CBD). COP15 represents a unique opportunity to forge an international agreement to reverse nature loss by 2030, like the 2015 Paris Agreement on climate change.

Only through collective action will business, governments and civil society be able to create an equitable, carbon-neutral and nature-positive world.

https://www.businessfornature.org

85 https://www.ecologique-solidaire.gouv.fr/sites/default/files/Thema%20-%20Commerce%20international%20et%20environnement.pdf
86 https://www.lecese.fr/sites/default/files/pdf/Avis/2020/2020_09_deforestation.pdf

Reducing pressures on biodiversity

From the design to the use of tires, MICHELIN works to limit the consumption of raw materials, contributing to reduce pressures on ecosystems and biodiversity such as over-exploitation of resources, land use, climate change and pollution.

For light vehicle tires, the company wishes to ensure that motorists use their tires up to the legal wear limit, guaranteeing a high level of safety performance throughout the tire's life (i.e. reaching the legal wear limit of 1.6 mm in Europe). This long-term performance approach aims to avoid replacing tires before they have been worn out, which is common practice, and to limit the consumption of raw materials that this replacement entails. In the space of one year, in France, the use of tires up to the legal wear limit could prevent up to 6.6 million tons of CO_2, the consumption of approximately 1 million tons of raw materials, and the production of an equivalent volume of waste. In particular, the production of nearly 5,700 hectares of rubber trees per year would be avoided[87].

For truck tires, there is also a circular economy solution that helps reduce pressure on biodiversity. Indeed, the casing of some truck tires is designed to allow for four successive lives through regrooving and retreading[88]. The environmental footprint of the tire is thus considerably improved.

Compared to non-retreadable tires, retreaded tires generate a material saving of:

- 29% of the rubber plantation area, thus limiting the risk of deforestation;

- 70% of raw materials (ores, oil, etc.), which can be explained in particular by the extensive use of the steel present in the casing;

- 19% of the water consumption related to the production of a new tire.

The volume of waste is also reduced thanks to the reuse of casings[89].

The law against waste and for the circular economy adopted in February 2020 in France helps to promote the practice of retreading by requiring local authorities to include retreaded tires in calls for tenders[90].

8 Supporting changes in employee behaviour

Biodiversity, as has been seen, is not only driven by top management decisions, but also by people on the ground at operational level. As it is impacted in very different ways, everyone needs to understand what biodiversity conservation means for their activities. Employee awareness is one of the ten common commitments in the act4nature initiative. Awareness building can be achieved through training, which is recommended for all employees, including senior executives. It can be also be achieved through the powerful medium of nature-friendly employees, whose initiatives should be promoted, encouraged and widely recognized. An example is Saint-Gobain's 'Sustainable Development Emeralds' award, which stimulates environmentally virtuous competition between the group's facilities. Act4nature, for its part, confers central legitimacy on local initiatives. Set out below are four different examples of changes in perception designed to embed nature-related considerations into the daily routine of employees.

87 Estimates based on the comparison between a generalize replacement of tires at 1.6 mm and a generalize replacement of tires at 3 mm, across the entire European vehicle fleet, over one year. Source : EY report, *Pas de fatalité à l'obsolescence programmée : impacts économiques et environnementaux de la généralisation d'un retrait prématuré des pneus tourisme dans l'Union européenne*, May 2017.

88 Retreading consists of reconditioning a used truck tire and reintroducing it into the circuit, as part of a circular economy approach, with all the advantages that this can entail for the environment and local employment.

89 Source: EY study, *L'impact socio-économique du rechapage poids lourd en France et en Europe, (The Socio-economic Impact of Retreading Truck Tires in France and Europe)* October 2016.

90 Article 60 of Law No. 2020-105 dated 10 February 2020 on the fight against waste, and on the circular economy.

Seeing "ordinary" biodiversity in a new light

Located near the Canal du Midi south-east of the city, the Toulouse Space Centre is the largest field centre of the Centre National d'Études Spatiales (CNES), the French space agency. Some 3,000 people—of which 1,700 CNES staffers—work here developing and operating space systems, sowing the seeds of the future. Green spaces cover a little over half of the 40-hectare site. Although these spaces are highly fragmented, their great potential for biodiversity encouraged CNES to conduct an initial inventory in 2017, with the goal of establishing an ecological picture of the site and laying the foundations of a biodiversity stewardship plan.

A Master's degree intern was tasked with this first step, which has been extended through a long-term partnership with the Master's degree in Biodiversity Management at Paul Sabatier University in Toulouse.

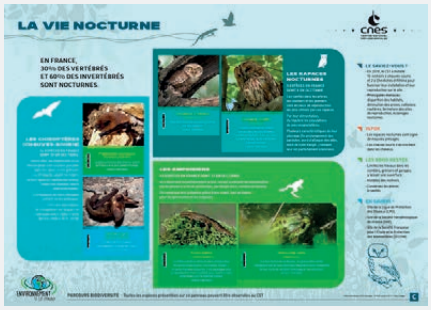
Three years on, CNES now has:

- a clear picture of the site's habitats;
- an inventory of its broad taxonomic groups;
- a database of species and their level of protection;
- an ecological diagnosis based on analysis of the inventory and a map of results;
- a stewardship plan encompassing a set of measures aimed at sustaining and nurturing the site's biodiversity;
- a plan to support differentiated management of green spaces.

Ten of the 20 measures proposed have already been implemented, including a biodiversity trail for employees at the centre. Thirteen illustrated information panels around the site explain the complexity of the living world and the concept of an ecosystem, highlighting a natural heritage largely unnoticed until now; thirteen stages revealing the hidden side of the site's ecosystems and main inhabitants.

In addition to scientific content related to the theme of each panel, four features—Fast fact, Misconceptions, Right reflexes and Learn more—dig deeper and give some key figures.

The trail has been open since this summer and should help to change the way CNES's employees see biodiversity issues while strengthening their support for its act4nature commitments.



Deloitte.

Raising awareness among decision-makers and collaborators to involve companies in the fight against the 6th mass extinction

Biodiversity is both less mediatized than climate change and seldom prioritized in companies' environmental impact mitigation strategies and action plans. However, various sectors and economic actors depend on biodiversity to pursue their activity. This disconnection can be explained by the fact that the challenges around biodiversity are varied, complex and heterogenous, with the stakes depending on the context in which biodiversity is studied.

In that respect, Deloitte participated in the development of the ***Fresque de la Biodiversité***, a fun and pedagogical workshop meant to help participants better comprehend the different issues related to biodiversity and its erosion.

Understanding helps to act

The *Fresque de la Biodiversité* was designed by Deloitte Sustainability teams in collaboration with the co-authors Charles Sirot, Geoffrey and Géraldine Vuillier, based on the scientific conclusions of the IPBES report. **This workshop enables participants to assimilate the scientific notions related to biodiversity, its mechanisms and its evolution**. The different impacts of human activity, and notably the five direct drivers of erosion, are explained. Concrete examples help to illustrate these concepts to facilitate their assimilation by participants. Finally, the dependencies that exist between society and services provided by the ecosystems allow consciousness to build on the scale of the situation.

Along the course of this participative workshop, participants exchange and debate in order to reorder the *Fresque*. The animators play a role in explaining the notions introduced, enabling the game and answering questions.

Enabling solutions to emerge

Within companies, this workshop allows decision-makers and collaborators to build awareness and to better structure their comprehension of the phenomenon of biodiversity erosion. Through this collaborative awareness-raising moment, the *Fresque* allows participants to **engage with biodiversity erosion on a brand-new scale, by facilitating the emergence of concrete and pragmatic solutions** linked to their specific firm and activities. This allows to build the basis for a biodiversity strategy.

Since May 2019, close to 2 000 people have been formed with this workshop. The co-authors aim to disseminate the *Fresque de la Biodiversité* workshop in a way that helps **reach more than 1 million citizens and decision-makers by 2025**. The end goal is to incentivize more companies to formalize their biodiversity strategies and action plans.

Raising employee awareness of biodiversity issues

Bayer rolled out a training on biodiversity issues for all of its 3,000 employees in 2019. This internal communications program was designed as a fun and educational way to build employees' skills and knowledge on biodiversity and related issues linked to the company's activities. It also goes a step further, encouraging employees to take action by giving them the keys to make changes in their daily lives.

The first part of the course is focused on the facts, with an overview of the state of biodiversity worldwide, the many threats and challenges it faces, and the biodiversity protection and restoration strategy implemented in France[91].

Because employees may not be familiar with every internal program, the second module focuses on Bayer's initiatives, both at group level and in France: the role played by agronomists specialized in sustainable agriculture (training on pests and crops auxiliaries to familiarize trainees with beneficial fauna, sharing best agricultural practices, etc.) and actions implemented across the forward farms network, including wildlife inventories, certification...

Further, Bayer France management team also decided to boost internal engagement by incorporating environmental criteria into the profit sharing agreements when they were renegotiated in 2019. The criteria focus on completion of the biodiversity training and reductions in the carbon footprint of employees' business travel. The biodiversity training has been so successful that the target participation rate was raised to 90% of employees trained by the end of the three-year agreement.

Promote bottom-up approaches

Since 2012, Primagaz has supported many bottom-up initiatives encouraging the daily actions of its employees at every levels.
Two programs completely integrated into the CSR policy promote actions for the protection of biodiversity by changing scale

#startingfromus

Free and open to all volunteers, this program consists of daily basis actions regarding ecological transition promoted by the employees themselves at the field level. At the end of our first CSR Tour de France in 2019, on four sites, twenty presentations took place, followed by more than 200 participants, with hundreds of questions and answers.

There are now ten useful and practical actions that have been chosen by our people as possible and quick actions to be implemented by them in one year.

Among them:

- recognition of flora and fauna on site,
- control of hot and cold temperatures in the offices,
- testing of a new carpooling solution,
- giving up heavy attachments in e-mails

91 https://www.bayer.fr/webzine/5-choses-savoir-pour-comprendre-la-biodiversite-et-son-importance

#heroesfornature

This is a commitment made in 2018 as part of our act4nature national initiative to embody and bring biodiversity concretely on sites.
Since 2019, and as part of our partnership with the French Committee of IUCN, the internal ambassador program "Heroes for nature" is dedicated to biodiversity and consists in the identification of a volunteer network at all company levels. Through the training program, our ten ambassadors will be able to manage biodiversity locally with the full support of a local specialist (ecologist or environmental association).

© Sébastien Robert

As with climate, the advantage of awareness-building among employees is that they promote the issue beyond their professional sphere.

9 Developing partnerships with scientists and NGOs

Partnerships can influence corporate governance from the highest level to local operations. They may include critical friends, scientific cooperation for the development of business-relevant tools, research funding, or local initiatives such as the many already mentioned.

Strong partnerships are a valuable tool to bolster environment-friendly action, foster dialogue and access to knowledge, and ensure consistency between public policy and corporate strategy in driving sustainable development. For this reason, they are strongly encouraged by the Sustainable Development Goals, as well as by the decisions taken at the various Conferences of the Parties to the Convention on Biological Diversity.

The following boxes illustrate several specific solutions adopted by EpE members. As explained in the EpE brochure "Measuring and managing biodiversity[92]", discussion and agreement between a company and its scientific and/or environmental stakeholders help ensure proper understanding of issues, make the assessment process credible, and decide management priorities. Companies need confidence in their long-term prospects in order to invest in new business models. This means concrete targets based on scientific evidence are needed to provide a clear direction and goal. Unsurprisingly, therefore, businesses are increasingly seeking and relying on vigorous and constructive support from academia, environmental NGOs, and even some economic partners, as the feedback below shows.

9.1. Scientific partnerships

Action on biodiversity is so complex and technical that it needs to be based on science; otherwise it might prove detrimental to biodiversity. Many partnerships exist, some longstanding, others recent. Some have already been mentioned above, more are described below. They can take the form of foundations or direct contributions from an academic institution to a particular business.

92 http://www.epe-asso.org/en/measuring-and-managing-biodiversity-october-2014/

The Climate & Biodiversity Initiative of the BNP Paribas Foundation

Improving knowledge on climate disorders and assessing their consequences on biodiversity, the environment and communities allow all actors to adapt their behavior. To tackle this challenge, the BNP Paribas Foundation has been supporting international research teams since 2010 that study past climate conditions on all continents, acidification of the oceans or the melting of permafrost...

Launched in 2010 by the BNP Paribas Foundation, the Climate Initiative programme was expanded in 2019 to include biodiversity issues and has become the Climate & Biodiversity Initiative.
The BNP Paribas Foundation will endow this program with €6 million between 2020 and 2022 to finance and develop new international research projects, laureates of his 4th call for projects launched in 2019. These projects focus on various issues such as the impacts of melting glaciers on global biodiversity, resilience of coastal ecosystems to extreme weather events, impacts of climate change and land use on biodiversity in the tropical forest ecosystems of the Amazon, or the reforestation of disturbed ecosystems.

The BNP Paribas Foundation has already supported eight projects of scientific research on ocean preservation and marine biodiversity, for an amount of 5.63 M€, thus contributing to the Sustainable Development Goal of the United Nations on life below water (n ° 14).

To get more information:
https://group.bnpparibas/tempsforts/climate-biodiversity-initiative/projets

A scientific partnership on behalf of biological diversity

Imerys has chosen to enlist the help of renowned experts in designing and deploying its biodiversity action plan. In 2018 the company signed a research, collaboration and expertise agreement with France's National Museum of Natural History, through the French government's PatriNat, or Natural Heritage, program, a partnership between academia and research institutions that also includes the French Biodiversity Office (OFB) and the National Center for Scientific Research (CNRS). This rigorous alliance is a cornerstone of Imerys's efforts, boosting the project's visibility and credibility among its stakeholders both inside and outside the company. PatriNat has been involved at every stage of the project, and helped to draft Imerys's act4nature commitments. The partners have jointly defined three closely correlated components of the project:

- a comprehensive strategy to improve Imerys's knowledge of the ecological environments of its sites, measure the impact of its activities, and define and implement actions to ensure continuous progress as well as methodologies and strategies that can be applied worldwide;

© Océane Roquinarc'h

- a specific approach on pilot sites to design and test tools that will enhance the comprehensive strategy and to lead R&D projects;

- a communications and training campaign. This is a key factor for cascading the project to every level of the company, training employees in the best available practices, disseminating knowledge and transferring know-how both within the company and to outside stakeholders (the scientific community, local communities, etc.).

This comprehensive partnership with PatriNat is helping to build and strengthen more local partnerships (at sites or within countries) with scientific organizations and environmental NGOs, especially with regard to research activities and actions taken at the pilot sites.

Those partnerships are a real asset for ensuring that companies can make progress on an issue as complex as biodiversity.

Considerable research efforts

EDF Group has a long-term commitment to improving knowledge. For over 30 years, EDF Group has worked with third-parties — such as the French Office for Biodiversity, the French Museum national d'Histoire naturelle... — on research programs to increase its scientific knowledge base and develop more efficient tools for evaluating its impacts on biodiversity.

For example, EDF Group's R&D division has launched BIODIV', a project with a €21m budget for 2018-2021 that, among other issues, seeks to develop greater insights into the operation of aquatic and land-based ecosystems, the ecological impacts of water discharges from nuclear power plants against a background of the climate emergency, the impacts of changes to water flows and river beds in the vicinity of dams, the impacts of the group's industrial installations on France's network of green and blue nature corridors, and ecological offsetting systems. One example is the work using acoustic cameras to increase understanding of how fish behave in their natural environment. When deployed around the dam at the Golfech nuclear power plant, this technique has made it possible to understand the behavior of predatory species such as catfish, and to make alterations to the fish passes to reduce the impact of this non-native species on native species such as the Atlantic salmon.

EDF Group is committed to publishing several results of its research studies via co-financed or co-supervised theses and/or post-doctoral studies, participation at national and international conferences, and in scientific publications.

Various research projects to value biodiversity

In order to imagine tomorrow's solutions to value biodiversity, several types of research studies are being conducted thanks to complementary partnerships established at different levels of the group.

The "lab research environment" is a scientific partnership between VINCI and the ParisTech business schools. Its objective is to improve the environmental performance of buildings, cities and infrastructures. Since 2008, AgroParisTech teams have been designing tools, based on a multidisciplinary approach, to reduce the impact of projects on biodiversity. The partnership has already contributed to the development of several environmental solutions supported by VINCI's business lines. This includes the Biodi(V)strict® tool, aiming at comparing the biodiversity impact of different construction projects in cities in order to recommend ecological developments.

Initiated in 2012, the partnership between Eurovia and the UMS Patrimoine Naturel (under the supervision of the National Museum of Natural History, the CNRS and the French Biodiversity Office) is a forerunner in the sector and its results have helped to improve scientific knowledge.

Main achievements are:

- the development of scientific tools and methods to assess the biodiversity impacts of a company's activities. Examples are : the Ecological Quality Indicator (EQI), which is a tool for temporal monitoring of biodiversity developed to meet the needs of site managers[93], or the OEIL approach, which anticipates the potential impacts of linear infrastructures on biodiversity according to ecological networks, the regulatory context or eco-potentials ;

- the implementation of action plans to reduce the biodiversity footprint;

- the monitoring and evaluation of the results.

Finally, research studies are conducted on the transport infrastructures managed by VINCI. The LISEA Biodiversity Foundation, created in 2012 as an extension of the South Europe Atlantic High Speed Line project, has participated in the financing of 100 local projects initiated by associations, companies or research centers located near the line. In the East of France, the project for the Western bypass of Strasbourg is the subject of several theses, notably on the Alsatian hamster or on chiropterans.

https://www.lab-recherche-environnement.org/fr/
http://www.patrinat.fr/fr/eurovia-6209

Experimental vegetable roof at AgroParisTech using urban residues as technosol components
© Baptiste Grard

93 Delzons, O., Gourdain, P., Siblet, J. P., Touroult, J., Herard, K. & Poncet, L. 2013. L'IQE : un indicateur de biodiversité multi-usages pour les sites aménagés ou à aménager. Revue d'écologie (Terre et Vie), 68(2): 105-119

LVMH

Examples of LVMH Group partnerships in favor of biodiversity on a large scale

In 2018, LVMH initiated a partnership Chair in "ecological accounting" in strong sustainability within AgroParisTech, joined by several stakeholders including the Order of Chartered Accountants and the MTES.

The objective of this Chair is to develop, test and implement extra-financial accounting systems that are at the service of all society and ecological transition stakeholders. According to the principles of strong sustainability, natural, economic and human capitals are not substitutable and must be maintained. The goal here is neither to give a "price" on nature, corresponding to the services provided to humans, nor to represent the environment as a natural capital made of assets, whether substitutable or not, it also shouldn't be a new way of creating financial opportunities.

Ecological accounting in strong sustainability, according to the Chair, means assessing the costs of the actions required to achieve good ecological status or conservation objectives, which are potentially dynamic and evolving, and defined from scientific and political conventions. The idea is to design a common language to initiate a new dialogue between society's actors around their relationship with the environment.

A full-scale test based on LVMH Champagne vineyards data is currently being conducted, which should lead to a broader deployment in order to change the way we look and valorise, on the long-term, the contributions of accounting to the preservation of nature and human well-being.

In 2019, LVMH signed a five-year partnership with UNESCO's "Man and Biosphere" program, of which motto is "Living in harmony with nature". Under this program, the Group finances the deployment of projects with environmental, social and economic benefits for biosphere reserves (701 reserves located in 124 countries). These projects, validated by independent scientific experts, are specific and adapted to local situations but also replicable on a larger scale for the conservation and sustainable use of biodiversity.

Ouessant Island, biosphere reserve

9.2. Other partnerships

There are many different kinds of partnerships. We will only mention two here. One concerns biodiversity at airports, with their vast buffer natural spaces. It is worth noting that public authorities have partnered with airports to ensure the compatibility of nature-friendly actions with operational security, and that several sector players are involved in these projects, gradually helping to change the management benchmark for these spaces. The other is the partnership between AXA Group and WWF France to help speed up the inclusion of biodiversity in the investment strategies and insurance activities of groups in the sector.

AIRFRANCE / GROUPE ADP

A common approach of the aerial sector to better value airport biodiversity

Contrary to popular beliefs, airports host closed and protected areas: their meadows constitute a preserved environment that are home to a rich and sometimes remarkable biodiversity, which helps developping the local ecosystem.
This is why the scientific community, administrations and aviation industry players have joined forces around common and shared objectives: to better understand, improve and promote biodiversity in airport areas while complying with safety constraints.

Created in 2015 after two years of preliminary work, Aéro Biodiversité association (former HOP! Biodiversité)'s mission is to assess and promote airports biodiversity, identify best practices and act as a link between actors of the sector to promote a more responsible management of biodiversity, while taking into account possible operating constraints.

The work is carried out using a methodological framework scientifically validated by the National Museum of Natural History (member of the association). It involves local staff through participatory science protocols. The data collected feeds into the national biodiversity knowledge databases.

While always giving priority to air safety - the Civil Aviation General Directorate is also a member - this work demonstrates that it is possible to enrich biodiversity in these areas by practicing adapted strategies (mowing management, zero-phyto...).
In 2020, the association brings together three airlines (Air France, Air Corsica, Air Saint-Pierre) and eighteen active airports (including five Groupe ADP's assets). All have integrated this project into their sustainable development policy and the association's commitment was recognized under the National Strategy for Biodiversity in 2016-2017

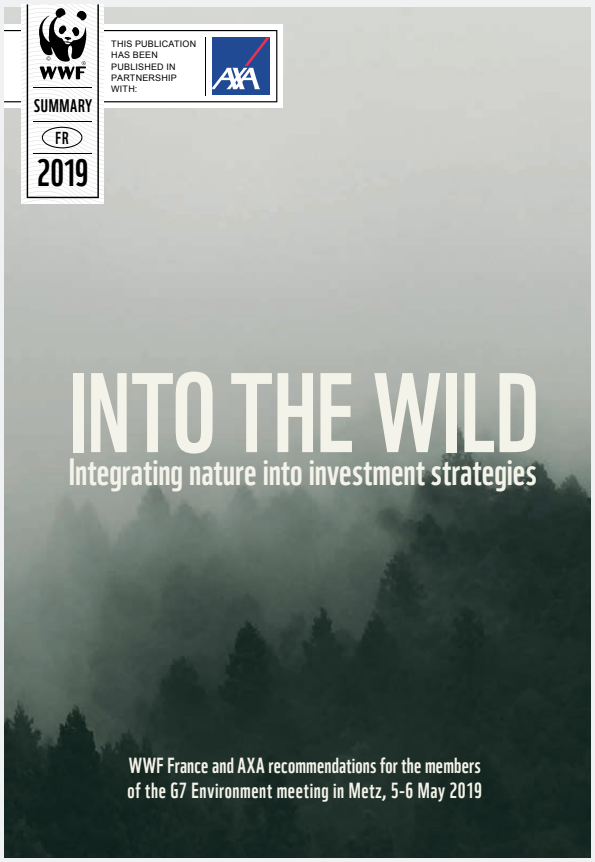
Since 2013, more than 2,900 plant and animal species have been identified on partners' sites in France, including 252 species of birds. As active members, Air France and Groupe ADP ensure the continuity of the project and its promotion among employees and the general public's through awareness forums, citizens' days, participatory observation sessions with employees, schoolchildren and the general public (more than 900 people were reached to in 2019 by actions carried out with the association).

For more information:
http://www.aerobiodiversite.org/

Integrating Nature into Investment Strategies

The loss of biodiversity puts ecosystem services at risk, which threatens both society and the companies that depend on it, and in turn the investors and insurers who depend on a healthy economy. At AXA, the challenge of biodiversity is seen as natural extension efforts to fight againstclimate change. Since 2018, AXA has committed to address these both as an insurer and as an investor.

A three-year partnership has been established with the WWF France to develop, among other things, biodiversity **risk metrics** that can be used by investors and underwriters. At the G7 2019 meeting, AXA launched recommendations co-developed with WWF highlighting how biodiversity loss can be addressed by investors through new forms of public-private collaboration. Our report "*Into the Wild, integrating nature into investment strategies*[94]" is designed to make investors aware of the loss of biodiversity and its economic and financial impacts. It makes several recommendations, including the creation of a "Taskforce on Nature-related Financial Disclosures", based on the TCFD[95] model, to promote the protection and restoration of biodiversity. AXA has launched its third **impact fund**, putting an emphasis on the protection of biodiversity. This fund will invest between 150 and 200 million euros to finance "nature-based solutions" solutions. AXA is also an active contributor to the **Ocean Risk and Resilience Action Alliance** (ORRAA), which aims to protect marine biodiversity and coastal populations via market mechanisms.



94 www.axa.com/fr/newsroom/actualites/comment-accompagner-la-transition-vers-laprotection-de-la-biodiversite
95 Task force on Climate-related Financial Disclosure

CONCLUSION

Building alliances to scale up solutions

Basile Van Havre, co-chair of the negotiating group on the post-2020 framework of the Convention on Biological Diversity, believes that two conditions are necessary for businesses to scale up their actions: "an economic rationale conducive to action; and the right enabling environment where businesses are not treated as scapegoats because we all must accept our share of the blame for biodiversity loss[96]."

The private sector has the wherewithal to deliver solutions, innovate, find answers and gain competitive edge while doing so. All EpE member companies are working towards this end. By sharing their best practices, they facilitate scaling up and take proper account of the specificities of biodiversity issues.

But this may not be enough. Étienne Maclouf, an academic specialising in human and ecosystem organizations, says companies should beware of mere scaling up, and urges them to focus their efforts on truly systemic change.

ÉTIENNE MACLOUF

Analysis of solutions contained in this publication

According to this publication, CSR is based on scientific knowledge. The effectiveness of each action is proven by a series of causal relationships leading to a measurable positive outcome for biodiversity. On a product-by-product or site-by-site basis, the outcomes for ecosystems are impressive. Following a scalability principle, from now on we need to define effective actions that can be mainstreamed.

These actions, analysed individually, appear to be conducive to biodiversity. But do they make our global trajectory compatible with maintaining conditions conducive to human life on earth? According to Bateson, by splitting the real world, these deductive arguments will lead to our demise because they overlook the "cybernetic circularities of the world"[97]. Closer to home, Ecole Polytechnique graduates Albert Jacquard, Jean-Pierre Dupuy and Isabelle Sorente alert us to the limits of our dominant form of industrial rationality. Indeed, we are unable to model all the causal chains, especially the future state of production systems whose ecological balance we hope to improve.

If the ecological transition[98] is an ideal, then it should not be limited to a sum of measurable goals but rather be treated as work-in-progress inspired by a truly global outlook.

We must therefore be wary of the tendency of business to institutionalise practices quickly when exposed to a legitimacy crisis[99]. Before biodiversity is allowed to disappear, ossified in a collection of best practices, it may not be too late for business to coordinate its efforts to bring about genuine systemic change. This would entail phasing out some activities that are essential to current business models, to make way for new activities designed to maintain ecosystem diversity.

96 Verbatim. Generation Climate Europe webinar: Mobilizing Corporates for Sustainable use of Nature. 30 June 2020.
97 G. Bateson. Steps to an Ecology of mind. Jason Aronson Inc., 1972.
98 https://pour-un-reveil-ecologique.org/fr/
99 A. O'Connor, J.M. Parcha and K.L.G. TuliSki. The Institutionalization of Corporate Social responsibility Communication: An Intra-Industry Comparison of MNCs' and SMEs' CSR Reports. Management Communication Quarterly, 2017.

In the same vein, the Business for Nature coalition recently called upon CBD negotiators to address the "need to clarify who is doing what, and which specific transformation actions and conditions are required[100]".

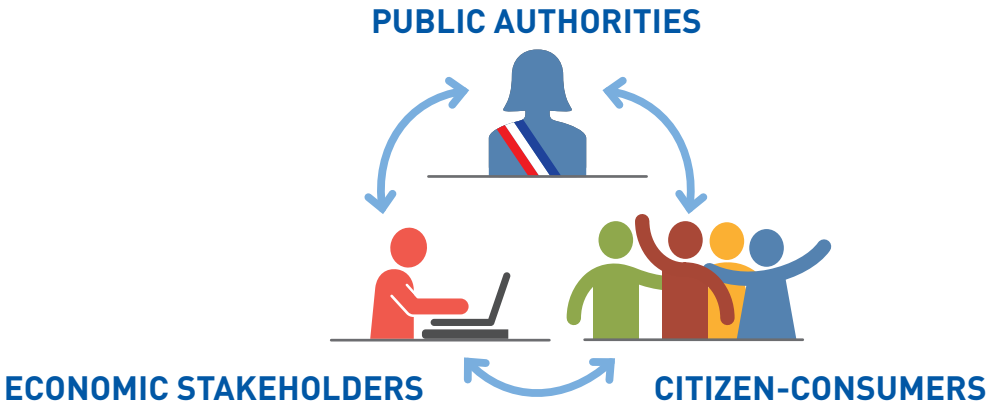
Are we able to conceive systemic changes beyond scaling up? As we saw in Chapter 1, stopping biodiversity loss implies setting out on a carbon neutrality pathway, as well as reducing other biodiversity pressures, land take, pollution, invasive species, and our consumption of natural resources, precisely when the reduction in emissions and fossil fuel use tends to result in higher consumption of those natural resources. The conditions for success are therefore still more demanding than those described in the ZEN 2050[101] study of the determinants of success in the effort to achieve carbon neutrality by 2050. It is important to clarify the ZEN 2050 recommendations, for example on agricultural practices and land take, and above all to incorporate the positive actions we have seen in Chapter 2, such as actively protect natural areas by increasing their size, sustainably use agricultural and forest land with lower productivity strategies, and proactively leverage every opportunity to reintroduce nature in cities and industrial sites.

Chapter 3 has shown that all corporate players and processes can factor in both biodiversity and climate issues, and that this endeavour is all the more complex as it cannot be achieved through straightforward economic tools like carbon pricing.

Our study has also shown, in its own way, that achieving the ambitious outcomes being sought exceeds the ability of any one stakeholder or category of stakeholders. "**With regard to the environmental issue, as with other global issues, we will achieve our goal only through coalitions** – of businesses, governments, associations, and citizens – where everyone is determined to take positive action for the common good[102]".

Such transformation also raises the issue of solidarity. Some examples have pointed to the need for resource rationing, such as the maximum number of animals to be raised in a given space. We know that fertile land is limited and likely to be further reduced by rising sea levels, that some land – not just deserts – must be reserved for protected areas, and that biomass consumption is rising to address the climate challenge. So the major challenge is to ensure human solidarity across the board. Public authorities will have the crucial role of overseeing this through massive transfers, including social, tax and other measures. This precludes satisfaction of all popular desires. The Western middle-class lifestyle cannot be shared on a mass scale. Instead, new, environment-friendly role models, desirable lifestyles and effective solidarity will be required. The Sustainable Development Goals are a good guide to this pathway, as they underline the vital needs to be met.

A broad alliance of stakeholders is needed to successfully factor biodiversity into the conclusions of the ZEN 2050 study.



100 https://www.businessfornature.org/advocate
101 http://www.epe-asso.org/en/zen-2050-imagining-and-building-a-carbon-neutral-france-july-2019/
102 https://www.linkedin.com/pulse/les-coalitions-un-levier-critique-pour-faire-de-la-une-bonnafé/

Specifically, the success of systemic transformation will depend on each of the following categories of stakeholders being mobilised in their respective capacities:

- corporates, of course, by innovating, injecting heterogeneity into their operations, designing solutions, investing in new tools, training employees, developing and deploying technologies, influencing other stakeholders, particularly citizens, and promoting lifestyles that are climate- and biodiversity-friendly;

- public authorities at global, regional, national and local level. Many of the actions mentioned call for strong incentives, regulations, and a level playing field for corporate players. The aim must be to establish a framework for the governance of common interests by ensuring solidarity between communities and stakeholders, and to promote respect for nature in all public policies, based on scientific approaches. Governments must also adopt - and see to the adoption of - a transition narrative, and ensure international coordination and negotiation regarding this transformation, along with local resource sharing;

- finally citizens, acting as consumers, customers, shareholders or employees of companies, voters (and thus masters of the policies adopted), and savers[103]. Their adherence to and active participation in these lifestyle changes are key success factors. So is their understanding of the issues at stake and their attachment to the idea of a nature that will play a much greater role in our lives than it does today. This cultural shift will undoubtedly be the greatest stumbling block, so profound is humans' disconnect with nature.

All of this sounds tough and it is already too late for some species, but nature has a capacity for resilience we can leverage when embarking on this ambitious transformation. Many EpE members are committed to this path, each in their own way.

103 Refer to the booklet by J.-F. Silvain and H. Soubelet. Sauvons la biodiversité ! Les 10 actions pour (ré)agir !, op. cit. and to 50 Gestes on the OFB website, https://agir.biodiversitetousvivants.fr/les-gestes/

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About EpE

Entreprises pour l'Environnement (EpE), a French association set up in 1992, is a forum for dialogue between business leaders and environmental managers and policymakers who share the vision of the environment as a source of transformation, progress and opportunity, exchange their best practices and work together to take better account of the environment in their strategies and operations.

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