



SUSTAINABLE  
FINANCE  
LAB

# THE FINANCIAL SECTOR AS A NEW AGENT OF CHANGE

THE CASE OF NATURAL CAPITAL ACCOUNTING AND REPORTING

---

Commissioned by the Netherlands Environmental Assessment Agency (PBL)

Rens van Tilburg and Elisa Achterberg

---

Oktober 2016

# Table of Contents

- Summary ..... 4**
- 1. Introduction..... 6**
  - 1.1 New non-governmental agents of change ..... 6
  - 1.2 The financial sector and natural capital accounting and reporting ..... 6
  - 1.3 Research questions ..... 6
  - 1.4 Research methodology..... 7
- 2. Natural Capital Accounting and Reporting ..... 8**
  - 2.1 Natural capital ..... 8
  - 2.2 Natural capital accounting and reporting ..... 9
    - Public and macro origins of natural capital accounting ..... 9
    - Accounting and reporting at the level of corporations ..... 9
    - Natural Capital Protocol ..... 11
    - Mandatory reporting..... 11
  - 2.3 Natural capital accounting and reporting in practice ..... 12
    - Carbon accounting..... 12
    - Biodiversity and land use ..... 12
    - Water use ..... 12
    - Overall state of play with regard to non-financial reporting ..... 13
  - 2.4 Development of natural capital globally ..... 13
  - 2.5 Potential for preserving biodiversity ..... 14
- 3. Natural Capital and the Financial Sector ..... 16**
  - 3.1 Natural capital and the financial sector ..... 16
    - Relevance of the financial sector to natural capital ..... 16
    - Relevance of natural capital to financial institutions ..... 17
    - Supervisors take natural capital into account ..... 19
  - 3.2 How to take natural capital into account in financial decision making..... 20
    - Setting hurdle rates and engage or exclude..... 20
    - Integrating natural capital in risk analysis and valuation models ..... 20
  - 3.3 Practice of taking natural capital into account..... 21
    - Public affairs and lobby policies ..... 22
    - Disclosure and transparency ..... 22
    - Quantitative targets ..... 22
    - Not yet part of the general risk framework ..... 22
    - Lack of data, capacity and capabilities ..... 23
  - 3.3 Finance and corporate natural capital accounting and reporting..... 24
    - Promoting disclosure..... 24
    - Developing tools for financial risk assessment ..... 24
    - Cooperating in networks with companies..... 24
    - Starting a dedicated financial network ..... 25
    - From natural capital accounting to reporting ..... 25

<b>4. The Financial Sector as an Agent of Change .....</b>	<b>27</b>
<b>4.1 The financial sector as a new agent of change .....</b>	<b>27</b>
From tradeoff between financial and natural capital.....	27
... to a virtuous cycle .....	27
Not there yet .....	28
<b>4.2 Explaining the performance of the financial sector as an agent of change .....</b>	<b>28</b>
Performance of the financial sector as an agent of change .....	28
The six building blocks of new governance arrangements .....	28
New partnerships and collaboration: building on co-benefits.....	30
New disclosure mechanisms for broader accountability .....	30
Taking a clumsy perspective and providing room for experiments .....	31
Reframing strategies .....	32
Rescaling strategies .....	32
Horizontal upscaling .....	32
Vertical upscaling .....	33
Directionality: guidance in a polycentric governance context .....	33
<b>4.3 Lessons for governments .....</b>	<b>33</b>
Financial sector as a complementary force in biodiversity preservation.....	33
... but no substitute for public intervention .....	34
Increase the (perceived) co-benefit of financial institutions .....	34
Promote disclosure.....	35
<b>Annex I      Literature .....</b>	<b>36</b>
<b>Annex II     Abbreviations .....</b>	<b>42</b>
<b>Annex III    Glossary .....</b>	<b>43</b>
<b>Annex IV    Interview list .....</b>	<b>44</b>

## Summary

### *A pragmatic approach: strengthening new non-governmental agents of change*

The Netherlands Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL) has suggested that governments pursuing goals in the field of biodiversity, instead of waiting for an intergovernmental consensus, may need to take a more pragmatic approach aiming at strengthening new non-governmental agents of change.

### *Like the financial sector...*

This report discusses whether the financial sector can be such an agent of change, specifically with regard to natural capital accounting and reporting. And if so, what governments can do to harness this potential. We do so by looking whether the building blocks for successful non-governmental agents of change as identified by PBL help to understand the dynamic in this particular field.

### *...with regard to natural capital*

Natural capital is the stock of natural resources on which human well-being and the economy depend. Natural capital is increasingly being measured. At first on a macro level, more recently also on the firm level. However, currently this firm level reporting is far from complete, with a substantial part of companies in natural capital sensitive sectors not reporting on natural capital or reporting data of an uncertain quality. Globally the natural capital stock is still depreciating, even at an accelerating rate.

Financial institutions through their loans and investments have a great impact on the global stock of natural capital. Increasingly asset owners, financial institutions and their regulators recognize the materiality of these impacts and dependencies for their financial performance. Thus financial institutions increasingly see the importance of gathering data on the natural capital impacts and dependencies of their clients and investments.

### *Pioneering work and proven effectiveness...*

A limited number of financial institutions have played an active role in developing methodologies for natural capital accounting and reporting. The success of mainstream financial institutions supporting requests for carbon accounting through the Carbon Disclosure Project showed the impact the financial sector can have.

### *...but still much to be desired*

However, more than a decade later, both the coverage and quality of carbon accounting and the translation of this in financial risk metrics is far from complete. For other themes of natural capital, like water and land use, the data availability is considerably poorer. And although increasingly there are tools available to assess the financial risk due to water shortages and other natural capital themes, the uptake of these is still very limited. Overall, financial institutions hardly set themselves clear goals or have an overview of their overall performance in the field of natural capital.

### *PBL's building blocks are all relevant*

We conclude that the building blocks identified by PBL for successful non-governmental agents of change are all relevant. Starting with the 'identification of co-benefits' for a very heterodox group of institutions (companies, NGO's, governments, financial and knowledge institutions). Clear shared goals were built ('directionality') through consortia like the Natural Capital Coalition and the Natural

Capital Declaration. 'Room for experimentation' was provided by companies and financial institutions that tested beta-versions of methodologies and tools. An interesting discussion is emerging around 'disclosure' between companies and financial institutions. Where companies mostly want to use the natural capital accounting mainly for internal decision making, whereas financial institutions demand reporting so that they can use the outcomes for their risk management. And whereas there is a large potential for 'horizontal upscaling', i.e. the adoption of the methodologies by other companies and financial institutions, this has not been realized so far.

### ***Governments can increase the availability of data and increase the relevance of these data***

Governments can strengthen financial institutions in their role as agents of change in the field of natural capital accounting and reporting through regulation that stimulates both the availability of relevant data (for instance through reporting requirements) and the use of this by financial institutions by increasing the (perceived) relevance of these data. The latter can be done either through research. This can be research on the relevance (materiality) of natural capital to their financial performance as well as on methodologies to assess this, for instance through developing scenarios of the impact of natural capital impacts and dependencies. Governments signal the importance of natural capital most effectively by creating a price for it through taxation and regulation.

### ***Government and financial sector complement each other***

Thus, whereas natural capital accounting and reporting does provide an instrument for the private sector to contribute to the preservation of natural capital, based on an improved understanding of its private interests, it is no substitute for public action. Public bodies need to guard the public interest and through rules and regulations set the boundaries within which the market can work.

We therefore conclude that the financial sector can act as an important agent of change, helping to preserve natural capital through the promotion and use of natural capital accounting and reporting. Governments can leverage the unique forward looking perspective and influence of the financial sector for the preservation of natural capital with targeted policies developed jointly with the front runners in the sector.

## 1. Introduction

### 1.1 New non-governmental agents of change

The Netherlands Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL) has suggested that instead of waiting for an intergovernmental consensus, global biodiversity governance may need to take a more pragmatic approach aiming at strengthening new non-governmental agents of change (Hajer 2011). In its report *A Pragmatic Approach to Global Environmental Governance* (PBL forthcoming) it identifies six building blocks for decentralized initiatives to meaningfully address large-scale environmental problems such as biodiversity loss. PBL wants to apply this framework to different areas by conducting a number of case studies. One of these being the international efforts of the financial sector to stimulate the use of natural capital accounting and reporting so that it can properly assess the risks and opportunities of its clients and investments with regard to biodiversity.

### 1.2 The financial sector and natural capital accounting and reporting

Increasingly the financial sector recognizes the potential threats and opportunities of the transition towards a more sustainable global economy, especially with regard to climate change and the energy transition. To assess these risks and opportunities data are needed on the exposure of financial institutions and the financial system to the different ecological imbalances (Schoenmaker and Van Tilburg 2016a, 2016b). Natural capital accounting, which includes carbon accounting, thus is a requirement for the financial sector to adequately weigh the risks and opportunities and to let the market work and manage the transition in an orderly way (Carney 2016). The European Commission mentions enhancing “the efficiency of capital markets” as a pathway along which mandatory non-financial reporting may have its effect (EC 2013). This thinking has led to the installation of an industry led task force on climate-related risk disclosure by the Financial Stability Board (Taskforce 2016) and a call for the development of stress tests and scenario’s to assess the risk of natural capital related exposures (SFL 2014, ASC ESRB 2016, Ecofin 2016). The use of non-financial data by the financial sector can also be an important driving force for companies to collect and publish these (Maas and Vermeulen 2016), as the cases of the financiers involvement with the Carbon Disclosure Project and the Access to Medicine Index have previously shown (AMI 2016, CDP 2014).

### 1.3 Research questions

This report discusses whether the financial sector can play a similar role for natural capital accounting and reporting as it has done with carbon and access to medicine before, and what is needed to realize this potential from government(s). We look whether the building blocks identified by PBL can help to understand this dynamic.

In order to do this we answer the following research questions:

1. What is natural capital accounting?
2. Which organizations are involved in the development of the natural capital accounting methodologies and stimulating its uptake? How are they organized?
3. How is the global stock of natural capital developing and what is thus the implementation gap vis-à-vis stated public policy goals?

4. What is the potential of natural capital accounting and reporting to conserve natural capital through the private sector?
5. What is the relevance of the financial sector to natural capital?
6. How is natural capital accounting and reporting relevant for financial institutions?
7. How do financial institutions account and report on their own (in)direct impact on natural capital?
8. What role do financial institutions play in the development of natural capital accounting and reporting methodologies and its implementation with its clients and investees?
9. How effective is the financial sector as an agent of change in the field of natural capital accounting and reporting?
10. In what way do the building blocks identified by PBL help to explain this performance?
11. What lessons can be learned from this case for governments that want to utilize the potential of the financial sector in preserving natural capital?

#### **1.4 Research methodology**

The research design relies mostly on qualitative methods for both data collection and analysis. We conducted a literature survey (both grey literature and peer reviewed academic publications) and held 10 semi-structured expert interviews (see annex for the list).

## 2. Natural Capital Accounting and Reporting

Natural capital is the stock of natural resources on which human well-being and the economy depend. It is increasingly being measured, on a macro level and more recently also on the firm level. However, this firm level reporting is still far from complete, with a substantial part of companies in natural capital sensitive sectors not reporting on their natural capital impact and dependencies or reporting data of an uncertain quality. On a global scale the natural capital stock is still depreciating in a fast and accelerating rate. Whereas natural capital accounting and reporting does provide an instrument to the private sector to contribute to preservation of natural capital, this is no substitute for public action.

### 2.1 Natural capital

The concept of capital is so central to current western society that it is often used as the single concept to define it, stating that we live in a 'capitalist' society or economic system. Adam Smith refers to capital as "That part of a man's stock which he expects to afford him revenue" (Book II, Chap. I, 1776). A meaning that over 200 years later still stands, as witnessed by the fact that [businessdictionary.com](http://businessdictionary.com) refers to capital as "Factors of production that are used to create goods or services" and "Wealth (...) assumed to be available for development or investment."

Given its centrality to society and economic progress, the development of the capital stock has increasingly been measured. The Industrial Revolution and the separation of the ownership of companies and its management fueled a rapid development of financial accounting methodologies and their implementation in the late 19<sup>th</sup> century.

In the late '60s of the 20<sup>th</sup> century the predominantly financial way of measuring economic progress and its fundamentals is increasingly criticized. As economic activities that hurt the natural environment, like deforestation for timber, are often accounted for as purely positive, whereas human well-being is also negatively affected or even fundamentally undermined by such economic activities. Thus natural resources are brought in the picture both as a flow of services with an effect on human wellbeing, and as an essential factor of production. This way the concept of 'natural capital' is born (Schumacher 1970).

It took until the early nineties before the concept of natural capital widely gained recognition and was measured by private companies as well. This 'non-financial reporting' by companies has grown strongly since in 1992 the Rio Conference's Agenda 21 stated that business and industry should be encouraged to report annually "on their environmental records, as well as on their use of energy and natural resources" (UN 1992).

In line with Adam Smith's early conceptualizing of capital, natural capital can be defined as "the stock of renewable and non-renewable natural resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people" (Natural Capital Coalition 2016).

Natural capital assets fall into two categories: those which are non-renewable and traded, such as fossil fuel and mineral “commodities”; and those which provide finite renewable goods and services for which no price typically exists, such as clean air, groundwater and biodiversity (TruCost 2013). Its value can be measured through the goods and services it provides, where these eco-system goods and services are defined as “the contributions that ecosystems make to human well-being” (EEA 2011). Biodiversity is an important constituent of natural capital and is defined as ‘the variability among living organisms from all sources (terrestrial, marine)’ (Vos, Grashof-Bokdam and Opdam 2014).

## **2.2 Natural capital accounting and reporting**

### **Public and macro origins of natural capital accounting**

From 2001 to 2005, the Millennium Ecosystem Assessment (MEA) assessed the consequences of ecosystem change for human well-being. More than 1,360 experts worldwide provided a state-of-the-art scientific appraisal of the condition and trends in the world’s ecosystems and the services they provide. The MEA popularized the term ecosystem services.

As a follow up the G8 Environment Ministers in 2007 initiated The Economics of Ecosystems and Biodiversity (TEEB) study, launched by Germany and the European Commission and later adopted by the United Nations Environment Programme (UNEP). The aim was to look specifically at the economics of biodiversity loss, not only from a public policy perspective but also that of business risks and opportunities. Former senior banker at Deutsche Bank Pavan Sukhdev led the effort. In October 2010 the report "Mainstreaming the Economics of Nature: a synthesis of the approach, conclusions and recommendations of TEEB" appeared. TEEB focused largely on forests.

In 2012 the UN Statistical Commission (UNSC) of the System for Environmental and Economic Accounts (SEEA) adopted the concept of Natural Capital Accounting and agreed on a method to account for material natural resources like minerals, timber and fisheries. Currently the focus of the global work is the World Bank-led programme Wealth Accounting and the Valuation of Ecosystem Services (WAVES), a global partnership that aims the integration of natural resources in development planning and national economic accounts. Bringing together a broad coalition of UN agencies, governments, international institutes, non-governmental organizations and academics (WAVES 2016).

The EU Biodiversity Strategy (2011) called on EU Member States to map and assess the state of ecosystems and their services in their national territory by 2014. They must also assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020. This is done through the Mapping and Assessment on Ecosystems and their Services (MAES).

### **Accounting and reporting at the level of corporations**

Following the call for natural capital accounting and reporting at Rio 21, the Global Reporting Initiative (GRI) was formed in 1997 by the United States-based non-profits Ceres (formerly the Coalition for Environmentally Responsible Economies) and the Tellus Institute, with the support of the United Nations Environment Programme (UNEP).

That year the World Business Council for Sustainable Development (WBCSD) and the WRI launched an NGO-business partnership to create standardized methods for GHG accounting. The WRI and WBCSD convened environmental groups (such as WWF, Pew Center on Global Climate Change, The Energy Research Institute) and industry (such as Norsk Hydro, Tokyo Electric, Shell) to guide the standards development process. The first edition of 'The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Corporate Standard)' was published in 2001 (WBCSD and WRI 2004).

The Carbon Disclosure Project (now CDP) was formed in the UK in 2000 by people from the London responsible investments community. It sent out its first carbon data request to corporations in 2003, when 235 companies responded. By 2009, the CDP was receiving carbon data from nearly 3,000 companies in more than 60 countries, giving it "the largest database of primary corporate climate change information in the world." In 2010 CDP also started collecting data on water and in 2013, after acquiring the Forest Footprint Disclosure Project, also on forest degradation.

In 2009, The Prince of Wales convened investors, standard setters, companies, accounting bodies and UN representatives, including the Global Reporting Initiative (GRI), to establish a globally accepted Integrated Reporting framework. The International Integrated Reporting Council (IIRC) consists of regulators, investors, companies, standard setters, the accounting profession and NGOs and introduced the International <IR> Framework in 2013. This framework comprises six capitals: financial, manufactured, intellectual, human, social and relationship and natural capital.

In 2010 also the 'TEEB for Business Coalition' started, renamed in 2012 as the Natural Capital Coalition (NCC), to bring together global stakeholders to collaborate on making nature visible in decision-making. The NCC's activities focus on bringing the many approaches to natural capital under one vision, and sharing and promoting best practices, focused research, development and testing of methods for natural capital accounting.

#### **Natural capital in the GRI-guidelines**

The GRI has developed sustainability reporting guidelines (the G4 Guidelines, 2013) that offer reporting principles and standard disclosures and an implementation manual for the preparation of sustainability reports. The GRI's G4 covers three of the six capitals as proposed by the <IR> Framework: human-, social and relationship- and natural capital. The guidelines focus on materiality (impact, dependencies and risks) related to materials, energy, water, biodiversity, emissions, effluents and waste, products and services, compliance, transport, supply chain assessment and environmental grievance mechanisms. In addition to its reporting framework, GRI has produced specific guidance detailing approaches for reporting on ecosystem services.

Other voluntary reporting standards that include natural capital are ISO 26000, The OECD Guidelines and the Sustainability Accounting Standards (SAS).

Several countries have initiated 'TEEB for business' projects at the national level, including Brazil, Germany and the Netherlands. In the Netherlands, in the so-called Green Deal 'Cooperating on Transparency of Natural and Social Capital' governments, business (e.g. AkzoNobel, DSM, FMO, Philips,) and NGO's work together, also with the Netherlands Institute of Chartered Accountants (NBA) and the Dutch Association of Investors for Sustainable Investment (VBDO).

## Natural Capital Protocol

Most of these non-mandatory reporting frameworks have linkages through shared board members and/or Memorandums of Understanding trying to streamline the reporting on common themes like Natural Capital. For instance, the Global Reporting Initiative (GRI) is partner of the IIRC, member of both NCC and NCD, signed an MoU with the OECD in 2010 and has an alliance with the CDP (Corporate Reporting Dialogue 2016). The NCC board initially comprised also GRI and WBCSD board members. The NCD working group on disclosure and reporting has a project manager from CDP (Capurri 2015).

The NCC in 2014 started the project to agree on a Natural Capital Protocol (NCP) as a response to the fact that companies measure and value their impacts and dependencies on natural capital in a myriad of ways which prevents comparability, consistency and mainstream adoption of these approaches (NCC 2016). The work on the NCP is funded primarily by the Gordon and Betty Moore Foundation as well as the Swiss Economic Ministry and the IFC (World Bank).

Two consortia led by the WBCSD and IUCN execute the work. Through these consortia around 60 NCC members are involved in developing the protocol, testing it and engaging with the wider business community.

The aim of the NCP is to enable business to assess and better manage their direct and indirect interactions with natural capital. Therefore it should:

- provide clear guidance on qualitative, quantitative and monetary valuation of natural capital impacts and dependencies and when to apply which level of assessment;
- be framed for use in different business applications;
- provide guidance on the applicability at different organizational levels (corporate, project, products, site);
- be applicable to all business sectors across all geographies.

The NCP has been released in July 2016. Over 40 companies have already tested various aspects of the NCP in depth, including household names such as Coca-Cola, Dow Chemicals, Hugo Boss, Nestlé and Shell.

## Mandatory reporting

The mainstream international accounting principles, like the International Financial Reporting Standards (IFRS) and U.S. Generally Accepted Accounting Principles (US GAAP), require the reporting of all issues 'material' to the firm. Where materiality of information is defined as being so relevant that its omission or misstatement could influence the economic decisions of users of the financial statements. It is therefore in the first place up to the company and its accountant to decide whether or not natural capital impacts and dependencies are material in this sense and hence need reporting.

Some supervisors have gone beyond this, explicitly requiring the reporting of certain risks associated with natural capital. For instance, Brazil has introduced a framework for banks as part of the local implementation of the international agreed rules (Basel III), which requires disclosure of banks' physical and transition risks. These disclosures can be used by the Central Bank of Brazil to conduct specific stress tests. France has recently introduced a law (Article 173 of the Energy Transition Act)

under which climate risk should be analyzed and reported as well as the strategy for addressing transitions to a low-carbon economy.

In the EU for the reporting on fiscal year 2017 over 6000 companies will have to report on their sustainability performance. More specifically, on the policies, outcomes and risks related to the current and foreseeable impacts on the environment, the use of renewable and/or non-renewable energy, greenhouse gas emissions, water use and air pollution. To this end the EC will publish non-binding guidelines. When referring to environmental aspects, the Commission should cover at least land use, water use, greenhouse gas emissions and the use of materials (EU 2014).

### 2.3 Natural capital accounting and reporting in practice

Here we discuss the current state of play of natural capital accounting and reporting. First for the specific themes of carbon, biodiversity, land- and water use. We conclude with some studies that have taken an overall perspective on non-financial reporting.

#### Carbon accounting

After the GHG-protocol was established, and thanks to the work of the CDP, currently over 4,500 companies provide some form of carbon data, including 82% of the 500 biggest companies in the world (CDP 2014, Rogers 2015). Which is not to say that carbon accounting and reporting is where it should be. Especially with regard to forward looking statements there is still a lack of information. Data from the Sustainability Accounting Standards Board (SASB) on the 2014 financial filings by the top US-listed companies shows that 27% of companies identified no climate risk at all. Of the 70% that did, only 15% used metrics, and 40% only “broad, nonspecific wording”. Users of climate-related financial disclosure commonly identify inconsistencies in disclosure practices, a lack of context for information, and incomparable reporting (Rogers 2015, Taskforce 2016).

#### Biodiversity and land use

MacLaughlin, van der Kruijf and van Dijk (2015) show that of the 265 companies within the six industries evaluated (diversified metals, food products, oil & gas producers, paper products and forestry, precious metals and steel):

- 80% report on biodiversity and land use issues through the identification of risks and implicitly through their related activities;
- 56% directly recognize biodiversity issues and implement programmes to address their impacts;
- The average quality of reporting of those companies that report on biodiversity and land use issues is considered weak.

#### Water use

The same study shows that of the 373 companies assessed across four industries that have a relatively high impact on local water demand and at the same time are vulnerable to reduced water supply (food products, paper and forestry, precious metals, and steel):

- 65% report on their management of recognized water use issues;
- Of the companies reporting on water extraction only 41% provided information on their water consumption;

- The average reporting quality of the companies that report on water issues is considered adequate;
- Between the four industries, food product companies had the highest percentage of companies with strong management systems at 40%.

### Overall state of play with regard to non-financial reporting

Companies currently report in a highly diversified way on their natural capital impact and dependencies. Even on the most widely reported natural capital theme of carbon users of the data still have much to wish for. This is even more the case for biodiversity, land and water use.

Much accounting that is done is also used only for internal decision making. In 2011, Puma established – as the first company ever – an Environmental Profit & Loss Account (EP&L) (Puma 2016). Many have followed suit, but only few of those have been publicly available. Illustrating that companies see natural capital accounting more as a tool for internal strategizing than for reporting to stakeholders.

Hurks et al. (2015) researched among 38 companies to what extent they complied with the <IR> Framework with regard to the fundamental concepts, guiding principles and the content elements. Around 82% of the companies do not report on negative KPIs and thus could be considered ‘incomplete’. Hurks et al. also ascertain a greater emphasis on risks than opportunities. There were no companies in the sample that provided quantitative connectivity between the capitals in their report.

A study by PwC (2013) on the top 40 companies listed at the FTSE/JSE found similar results. Only 6% of their sample effectively communicated holistic performance (in terms of KPIs), and only 13% gave quantitative communication on their future outlook and the plans of the company to create and sustain value over the medium and long-term.

Maas and Vermeulen (2015) conclude that in contrast to financial reporting guidelines, the non-financial reporting guidelines are to a lesser extent comparable. Non-financial information is often reported in a disconnected way to strategy, risks, opportunities, operations and financial performance.

## 2.4 Development of natural capital globally

Natural capital is the fundament of human wellbeing and the economy. And whereas its ecological services can be enjoyed freely and some of the natural capital stock can be used as it has a certain capacity for regeneration, there are clear limits to this. Limits that are increasingly surpassed.

The MEA found that human actions are depleting the natural capital, putting such strain on the environment that the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted. The five largest pressure factors on biodiversity are land conversion, climate change, the introduction of exotic and invasive species, overexploitation and pollution.

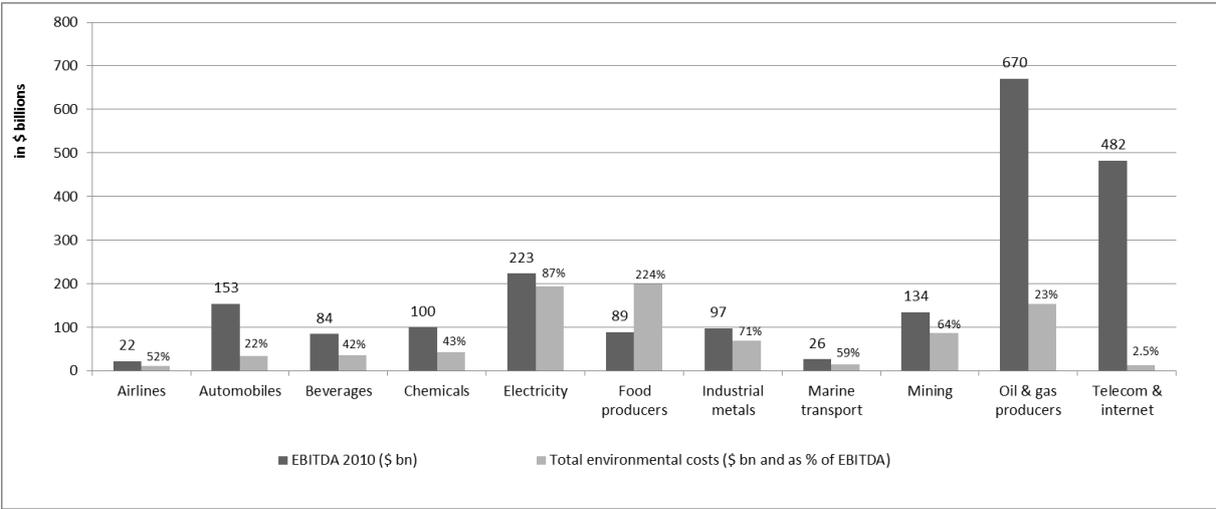
Scientists have identified nine planetary boundaries that define the ‘save space’ for humanity to live within. Four of these boundaries have already been crossed: climate change, loss of biosphere integrity, land-system change, altered biogeochemical cycles (phosphorus and nitrogen) (Rockström et al. 2009).

We are drawing down on our natural capital at a rate of 50 percent more per year than the earth can replenish, and this rate of depletion is accelerating. The number of wild animals has halved in the past 40 years (WWF 2014).

TEEB has monetized the loss of natural capital at \$2–4.5 trillion per year (2008). A study by Trucost found that economic activities are estimated to generate \$7.3 trillion in external environmental costs per year or 13% of global GDP. Another estimate of the average annual economic cost of human-induced environmental depletion in 2008 was \$6.6 trillion, equivalent to 11 per cent of global GDP (UNEP FI 2011). If environmentally unsustainable activity continues at this scale, the annual costs for the global economy will reach nearly \$28.6 trillion by 2050, equivalent to 18 per cent of global GDP. Of this, greenhouse gas emissions account for a large and growing share, rising from 69 to 73 per cent between 2008 and 2050.

Being in the double digits as a percentage of GDP these numbers certainly are material. However, as a percentage of the company profit they are even substantially higher in most sectors. The cost of environmental damage caused by 11 key industry sectors in 2010 was equivalent to 41 per cent (KPMG, 2012) to over half (UNEP FI, 2011) of their pre-tax profits (see Figure 1). Some sectors, such as food producers, would have no profits left if they had to pay the full cost of their negative environmental externalities (KPMG, 2012).

**Figure 1. Negative environmental externalities (in \$ bn and percentage of EBITDA; 2010)**



Source: KPMG (2012)

The transition to a sustainable economy poses risks to the laggards, but also opportunities for the companies that are front-runners. Various studies done by McKinsey for the Ellen MacArthur Foundation (2012, 2013, 2014) illustrate the potential of the circular economy for companies. These studies find net materials cost savings up to \$630 billion per year.

**2.5 Potential for preserving biodiversity**

Using the concept of natural capital to link economic activities with the natural environment has raised awareness amongst policymakers and business about these linkages. It has thereby raised awareness about biodiversity loss and introduced economic arguments to preserve it. Starting at the global level with the MEA and now increasingly also on the level of the firm. Neglecting the natural

capital impacts and dependencies of a company is increasingly becoming an issue of bad corporate governance. This brings protection of biodiversity beyond the realm of corporate social responsibility. Whereas no requisite for this, monetization of natural capital was “often noted as being an effective way to incorporate natural capital elements within CapEx decision-making processes” (NCD 2015).

Critics however argue that bringing nature into the economic and financial realm also has its drawbacks. One argument is that nature has an intrinsic value and thus should not be exclusively judged by an economic cost-benefit analysis. Especially not one of a private institution as natural capital often is a public good. These critics fear the commodification of nature through a process (‘financialization’) that legitimizes the overexploitation of nature (Splash 2011, Monbiot 2014, FOEI 2015, Simms 2016).

Whereas in economic theory the concept of natural capital may be sound, in practice it may work out in undesired ways. When markets work well, they will value natural capital properly: as it becomes more scarce its value will go up, and hence the economic motive to preserve it will strengthen. However, this assumes that all market participants are aware of all the economic values that nature can provide (perfect information), have a long time horizon in making their economic decisions and that property rights are always valued.

Critics of the natural capital concept argue that these are unrealistic assumptions. In practice, there are fundamental uncertainties with regard to value of natural capital due to the role it will play in the future: we do not know how a forest might be of economic value in the future. And in practice there are many more market imperfections, around information and short termism of companies and their financiers (van Tilburg 2010, Kay 2012, Barton and Wiseman 2014). In combination with the kind of credit booms that are increasingly and more forcefully happening in recent years (Borio 2012) this may indeed lead to an overexploitation of natural capital. Compare the over exploration during recent booms in internet stocks and subprime mortgages. Whereas these booms only led to the losses in the financial sphere, a similar boom in the use of natural capital may lead to irreversible damage.

More fundamentally, with regard to natural capital principles may be at stake that require not decision making by cost-benefit analysis but rather in a democratic way that allows for a multitude of personal values and preferences to be weighed. For instance principled discussions, like those about GMO, cannot be satisfactorily settled for everyone by simply adding economic costs and benefits. Natural capital accounting and reporting by private institutions is therefore no substitute for public authorities safeguarding the public interest through rules and regulations. General limitations of the use of financial modelling also apply for companies and financiers that integrate natural capital into their decision framework: it supports thinking, but is no substitute for it.

Public bodies need to guard the public interest and through rules and regulations decide on the boundaries within which the market, through the natural capital valuation, can work. However, within these boundaries and with these warnings, natural capital accounting and reporting can be a useful instrument to optimize the use of natural capital in the economic process.

### 3. Natural Capital and the Financial Sector

Financial institutions through their lending and investments have a great impact on the global natural capital stock. Increasingly these natural capital impacts and dependencies are seen by financial institutions and their regulators as material for their financial performance. Several tools have been developed to analyze these risks and opportunities. However, so far this is mostly done in a qualitative way and this assessment is not integrated in the general risk framework.

#### 3.1 Natural capital and the financial sector

##### Relevance of the financial sector to natural capital

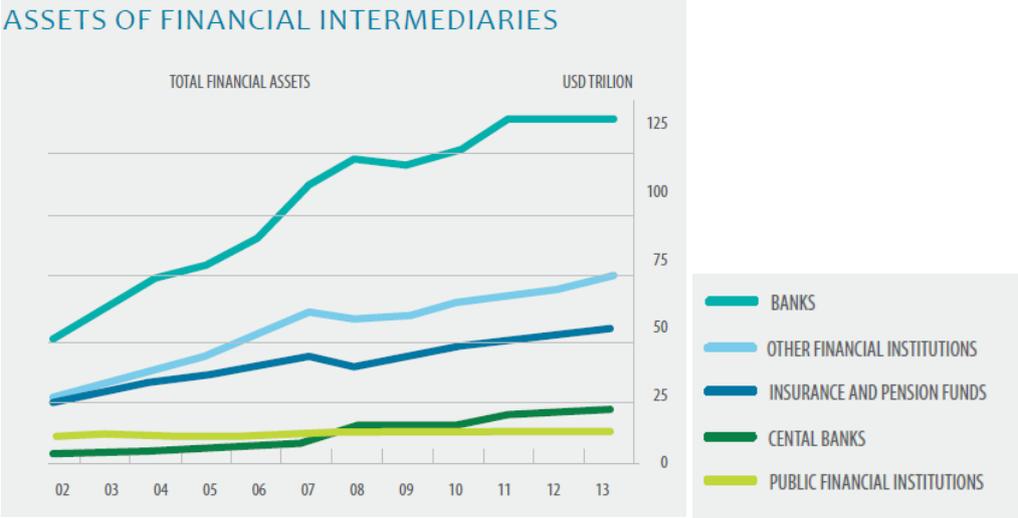
The financial sector performs a crucial role in society as companies and households often need it to realize their plans, to get the means for their investments. It is banks and asset managers that set the price for the financial capital and decide who gets the scarce funds available. Investments can have important implications for biodiversity, like an investment in energy saving of the home or the building of a new production plant that requires energy, water and land. And even though most investments are done with so called 'retained earnings', profits made by the company, for stock listed companies this is still money about which the management ultimately has to account for to its shareholders. Financiers, banks and asset managers, thus have potentially a strong influence on the natural capital impact of households and companies.

##### **It is the indirect impact that matters**

The overwhelming majority of the natural capital impact of the financial sector is through the companies and households that it finances, its secondary or indirect impacts ('scope 3' in the terminology of GHG Protocol Corporate Value Chain Standard). And thus not through its own operations, its buildings, transportation, paper and energy use. For example, the annual financed emissions of Canadian banks with large financing relationships with fossil fuel companies were about 100 times larger than the direct and indirect emissions from their operations (Rainforest Action Network 2012). Other sources report emissions to be over 1,000 times larger (World Development Movement 2013, Ecofys 2015).

Figure 2 below shows that banks hold globally most assets, including credit to their clients. Insurance and pension funds invest in both debt and equity of companies.

**Figure 2. Financial assets of different financial intermediaries globally**



Source: UNEP Inquiry (2015)

**Relevance of natural capital to financial institutions**

Whereas financiers do have a large (albeit indirect) impact on natural capital, this does not necessarily mean that this impact is also a material issue for the financial institution itself; an issue they take into consideration in their decision-making and about which they need to report to their stakeholders. For this they use decision-making frameworks that to a large extent have been developed in times that natural capital was seen as an infinite source, and thus one whose price was negligibly low. Therefore until quite recently natural capital has not been part of the financial metrics that guided financial institutions; the financial metrics that indicate to the financial institution how likely it is that the lender will be able to repay his loan with interest (for banks and bondholders) or what the future profit will be (for public and private equity investments). Are these expectations good, then banks will agree on relatively modest interest rates. Is the expected risk higher, then the interest rate will go up, as money must be set aside as a reserve for the expected loss. Are the expectations of future profits higher then also the price of a share of the company will be higher. Financial institutions are led by these financial considerations as their financial performance determines the income of its employees, its competitive position in the market and its future survival as well as its license to operate. The better the financial results, the more means to reward the employees. The better the financial results, the easier it also is for the financial firm to attract capital itself. The higher the interest it can pay on deposits, the more savings the bank will attract. The higher the return of the assets under management, the more assets the asset management firm will receive. Lastly, financial institutions have to comply with different financial liquidity and solvency requirements. If they fail to do so regulators no longer allow them to operate freely.

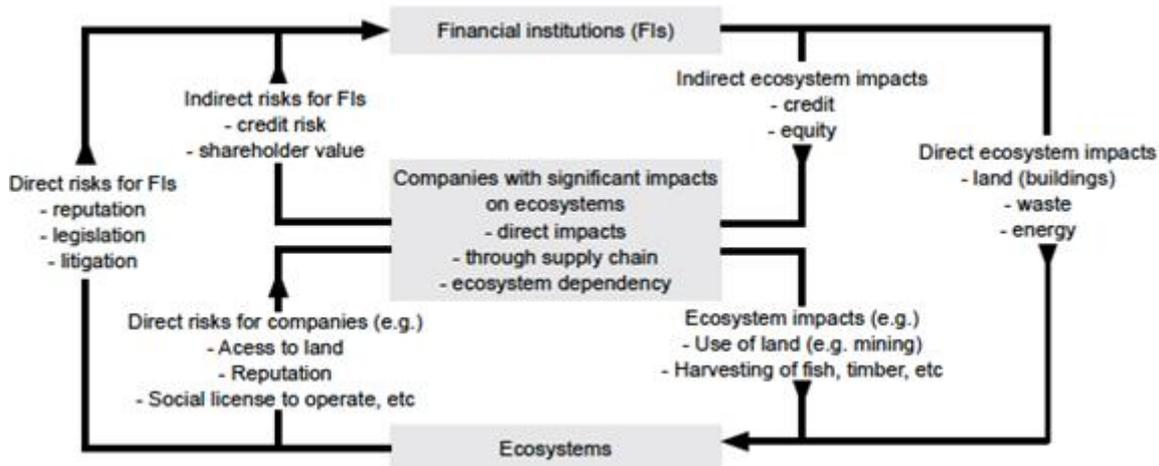
### The value perspective

Next to the exclusive financial perspective that is central to this report, financial institutions can also be guided, even primarily, by other social and ecological values. For instance, in some countries, like the Netherlands, financial institutions are obliged by law to seek a balance between the interests of shareholders and other stakeholders. Dutch bankers have even sworn an oath to do so.

There are also financial institutions, or products, that explicitly take non-financial values into account. Like public development banks, the banks of the 'Global Alliance of Banking on Values' or 'impact investors' and 'responsible investment funds'. These 'ethical' financial institutions and products often play an important role in developing methodologies for taking natural capital into account. However, due to the still limited scale of these ethical institutions and products, the impact of these methodologies is strongly increased when they are adopted by mainstream financial institutions. That requires the financial case for taking natural capital into account to be made.

How can natural capital impact the financial accounts of banks and asset owners? There are several (interlinked) ways through which natural capital impacts can translate into financial impacts for financial firms. The figure below from NCD gives an overview.

**Figure 3. Linking ecosystem impacts with financial institution risks**



Source: NCD (2013)

The six main ways in which natural capital management can be a material issue for financial institutions are (UNEP FI 2008, NCD 2013):

- *Reputational risk*, as retail customers, business clients and funders may withdraw as a result of natural capital costs caused by financed companies that are deemed excessive;
- *Credit- and investment risk*, losses at clients due to disrupted business operations caused by failing ecosystem services or the inaccessibility of crucial input (like virgin raw materials) or because these companies see customers and other funders withdraw for reputational reasons. Or as governments stop giving permits and concessions or end existing ones;

### **Natural capital related risks for palm oil producers**

In a series of reports, Chain Reaction Research (CRR), a collaborative effort of Aidenvironment, Profundo and Climate Advisers, analyzed how different listed palm oil companies are exposed to risks related to natural capital impact and dependencies. In February 2016 CRR published a report predicting that the Round Table on Sustainable Palm Oil (RSPO) could suspend IOI Corporation from Malaysia due to the clearing of forests. When the RSPO did suspend IOI soon after, the company started losing purchases from 20 major customers such as Unilever, Nestlé and Kellogg's. IOI's share price fell 17.6% while Moody's reviewed its debt for a downgrade. Losing major buyers is one clear risk. Another risk is the loss of concession areas which can be developed into new plantations (the 'landbank') as governments increasingly protect their natural capital. Indonesia recently announced a moratorium on new plantation developments (van Gelder 2016).

- *Business opportunities*, businesses can profit from the challenges of natural capital preservation by providing solutions. Financial institutions may also themselves profit from new products inspired by the preservation of natural capital like the strongly growing green bond market and the market for responsible asset management;
- *Legal liability risk*, that may become apparent as national laws, banking regulations and reporting requirements become more demanding and increasingly seek to incorporate non-financial issues. This liability may extend to the financial institutions and professionals themselves. Thus, not pro-actively raising ESG issues presents "a very real risk" to be "sued for negligence" (UNEP FI 2009);
- *Market and systemic risk*, whereas individual financial institutions can adapt their portfolio according to the risks and opportunities they see, not all natural capital risks can be 'hedged' in this way (CISL 2015);
- *Regulatory risk*, regulations pace of introduction is likely to quicken and tighten, such as for combating climate change (see box below on the 'carbon bubble'), clean oceans or –air, creating risks and opportunities.

### **Case of carbon bubble**

Especially insurance companies have been aware of the physical risks that climate change poses to their business model. As the earth heathens the damage of hurricanes, flood and wildfires will increase. However, there is also a financial risk if the global community succeeds in limiting climate change to the 1.5-2 degree. As many financial assets derive their value from operations that are not compatible with the remaining carbon budget. For instance, estimates are that only 20-40% of all known fossil fuel reserves actually can be burned. This will reduce the value and creditworthiness of many companies and sovereigns (Carbon Tracker Initiative 2011). In this carbon bubble scenario equity owners will be particularly hard hit (pension funds, insurance companies), but also lenders (banks) will suffer because the percentage of non-performing loans will rise (Weyzig *et al*, 2014).

### **Supervisors take natural capital into account**

Financial supervisors are increasingly a driving force for integrating ecological considerations in financial decision-making. A development that started at emerging countries like Brazil and Bangladesh with economies that are particularly dependent on natural capital and with often less strict implementation of laws and regulations meant to protect natural capital (UNEP Inquiry 2015).

More recently also financial regulators in the European Union increasingly pay attention to ecological risks, particularly those related to climate change and the energy transition. The Bank of England was the first with an investigation of the UK insurance market (BoE 2015). The Dutch central bank (DNB) has looked at the pension fund sector.

At the international level the Financial Stability Board established the Taskforce on Climate related financial disclosures that will present its recommendations at the end of 2016. The European Central Bank was advised by the Academic Council of the European Systemic Risk Board to incorporate climate-related prudential risks into regular stress test exercises (ASC 2016). Also the European ministers of Finance stressed the need to make the carbon exposure of financial institutions more transparent (Ecofin 2016). The Chinese chair at the G20 started a study group on sustainable finance that also has a work flow on assessing climate risks.

### **3.2 How to take natural capital into account in financial decision making**

Financial institutions that want to integrate natural capital into their decision making framework can do so in several ways, and subsequently can choose different strategies to reduce risk and grasp opportunities. Whereas bank lending requires a markedly different approach than asset managers that invest in equity, we describe here some general principles that are relevant to all financial institutions.

#### **Setting hurdle rates and engage or exclude**

The first way to take natural capital performance of corporations into account is through setting some kind of hurdle or threshold that each company needs to take. This can be formulated along policy or governance lines, like having a certain policy in place to flag and mitigate natural capital issues, or can be in terms of certain real exposures. Through setting minimal performance standards the financial institution safeguards that it is not financing a company that through its natural capital impact and dependency poses a financial or reputational risk.

This is done for instance for project finance through the Equator Principles and the IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living. Many banks and asset managers also formulate exclusion criteria. These can result in a hard exclusion or to an engagement with the company asking for a change of its conduct in this field.

Whereas this hurdle-approach through exclusion and engagement can have an effect on the natural capital performance of companies and the exposure to this of financial institutions, it is a rather binary approach: a company is either in or out. This leaves a whole spectrum of different natural capital performing companies above the hurdle with an undifferentiated approach by its financiers. In order to do make a distinction between these companies a more full integration is needed of the natural capital performance of companies in the risk analysis and valuation models.

#### **Integrating natural capital in risk analysis and valuation models**

Increasingly financial institutions are trying to quantify the risk in economic terms. This enables them to differentiate between the companies that they finance based on the estimated financial impact of the specific natural capital impacts and dependencies. The natural capital performance can then be translated into the pricing of loans and the valuation of equities. Companies that perform well then get financing under more favourable terms. Companies with higher natural capital risk will face higher capital costs and thus be incentivized to improve their performance.

If the risk is quantified it also becomes possible to see how the risk of the overall portfolio is developing and to set targets for this both at the level of the financial institution and of specific asset classes or divisions ('risk appetite') and for employees ('key performance indicators').

This integration of natural capital related risks and opportunities requires modelling. This is mostly done on the basis of historical data. As these data are not widely available, and due to the nature of the issue (many natural capital themes are facing an unprecedented transition) the alternative of estimating risk through scenario (stress) testing seems more appropriate.

#### **Robeco integrating ESG performance in equity valuation**

Asset manager Robeco has integrated the valuation of the ESG performance of companies in its valuation of equities. Since January 2014 its analysts are required to explicitly quantify the impact of the most material ESG issues in their analysis. 'Environmental management' and natural capital factors such as 'climate strategy' and 'product stewardship' are especially material in the resources sectors (energy, materials, industrials and utilities). In 9% of 178 portfolio changes made ESG was decisive and in 28% it played an important role. The average target price impact is 5% overall, and 10% for those equities where a change was made on the basis of ESG-factors. Target price changes ranged from -23% to +71%. The very preliminary findings of the impact on the financial performance are also positive. As the ESG-driven portfolio decisions outperformed their relative sector indices on average by over 5% annualized (Schramade 2016).

Over the recent years several tools have been developed to assist financial institutions in assessing natural capital related risk, like:

- **Water** Risk Valuation Tool (Natural Capital Declaration);
- Ceres **Aqua** Gauge Tool (for assessing and improving water risk) (CERES);
- Corporate Bond **Water** Credit Risk Tool (Natural Capital Declaration);
- **Carbon** Risk Valuation Tool (Bloomberg New Energy Finance);
- Sustainable **Seafood** Finance Tool (Sustainable Seafood Finance).

#### **Soft Commodity Forest Risk Tool**

The Natural Capital Declaration (NCD) has developed with Sustainalytics a lending and investment policy tool for financial institutions to reduce the deforestation risk caused by the unsustainable production, trade, processing and retail of soft commodities, especially soy, palm oil and beef.

The framework gives criteria to assess the scope, strength and implementation, reporting and monitoring of policies of companies. The Excel-based tool is free to download, allowing financial institutions to assess their own lending and investment policies and explore how changes would affect their score. Financial institutions can benchmark their policies against 30 financial institutions.

### **3.3 Practice of taking natural capital into account**

Here we describe the practice of financial institutions as complete as possible. However, work done by financial institutions for internal purposes misses from this overview. As with companies this can be substantial, as also financial institutions may be reluctant to disclose their currently unaccounted risks that still lack a good mitigation strategy. Still, from the public sources it is clear that most large western financial institutions currently have some form of sustainability policy in place that takes natural capital into account (UNPRI 2016, KPMG 2015, VBDO 2016b, Eerlijke Bankwijzer 2015).

However, large differences exist between financial institutions in terms of scope and level of ambition of these policies.

### **Public affairs and lobby policies**

Recognizing that they cannot isolate themselves from climate change, investors have joined forces to influence the public policymakers to take the necessary steps to reduce climate change. In the run-up to COP21, 350 investors representing more than \$24 trillion in assets under management called on world leaders to forge a meaningful and ambitious climate agreement, in recognition of the risks that climate change presents to their investments. However, no such initiative of the financial institutions was taken in the run up to the Convention on Biological Diversity.

### **Disclosure and transparency**

Financial institutions also voice their need for data. More than 822 institutional investors, representing over \$95 trillion in assets, are CDP-signatories, asking companies worldwide to disclose their carbon emissions and how they are managing climate-change issues.

With the Montreal Carbon Pledge, 120 investors representing over \$10 trillion in assets, committed to disclosing the carbon footprint of their investment portfolios.

### **Quantitative targets**

Banks, asset owners and asset managers are also increasingly setting goals to reduce their exposure to financial risks with an ecological origin. For example, by reducing the financed carbon emissions. By signing the Portfolio Decarbonization Coalition 25 investors with a total of \$600 billion in assets under management pledged to gradually reduce their carbon exposure.

Individual financial institutions are also setting themselves carbon exposure reduction targets. The two largest Dutch pension funds PFZW and ABP respectively set themselves a reduction target of 50% and 25% before 2020. Allianz, a major European insurer, is another example of institutional investors with explicit climate objectives in their long-term investment strategies. Finally, following its smaller ethical affiliation ASN bank, Dutch bank SNS set itself the target to become wholly climate neutral in 2030 (SNS 2016).

### **Not yet part of the general risk framework**

Despite the fact that many financial institutions state that the financial impact of natural capital can be material, it is mostly not taken into account in the general risk framework. Therefore the financial sector is not giving the financial incentives to companies to take natural capital into account that it could, as outlined above.

The scoping study of the Natural Capital Declaration on the Soft Commodity Forest Risk Tool found that few financial institutions were systematically quantifying their exposure to these risks and opportunities at a portfolio level. Challenges associated with analyzing and quantifying risks related to soft commodities include access to information, lack of resources and difficulty in defining risk (NCD 2015a).

Looking at the sustainability integration of 12 major European banks KPMG concludes that (KPMG, 2015) environmental and social (E&S) reporting and disclosure is still in its infancy:

- Whereas more than 50% have sustainability in their strategy, there are no quantitative goals;
- The assessment is made by all banks at client and project level, but there is no view at portfolio level;
- Sustainability is not part of the main risk assessment (or only seen as part of reputational risk) and thus no E&S stress test or scenario analyses have been performed;
- Periodic E&S risk identification is qualitative and not yet quantitative;
- Only one bank (HSBC) included E&S risks in risk appetite statements and its risk limits framework.

With regard to investments the picture is rather similar as a large number of asset managers (nearly half by some estimates) do not analyze climate risks and opportunities at all, due in part to a lack of access to adequate disclosure information (High Meadows Institute 2015). Given the poorer data and generally perceived materiality of other natural capital themes the overall picture there will most probably be even bleaker. This contrasts with the wish of two thirds of the global institutional investors to consider ESG information in their investment decisions (WBCSD 2014).

More specifically with regard to natural capital a scoping study at 36 financial institutions (mostly banks, out of 100+ that were requested, hence the self-selection bias) of the Natural Capital Declaration finds that (NCD 2015b):

- Almost half see natural capital as very or extremely relevant to their core business strategy;
- 75% said they monitor natural capital risks at a transaction level;
- 42% said that they take natural capital factors into account in credit risk assessments;
- However, there is no evidence of systematic quantification of these risks.

### **Lack of data, capacity and capabilities**

As reasons for not more fully integrating natural capital in their decision making process financial institutions refer to limited budgets, personnel and capabilities to analyze natural capital risks (NCD 2015b). Also the available data is considered insufficient, even for the best-developed natural capital theme of carbon. As the taskforce on climate related disclosures noted (2016): “Users of climate-related financial disclosure commonly identify inconsistencies in disclosure practices, a lack of context for information, and incomparable reporting as major obstacles”.

Also research providers and consultancies can give only partial insight into the natural capital related risks and opportunities. In its scoping study the NCD (2015b) found that:

- Only 26 of 66 have detailed methodologies available to offer environmental risk-related research or capacity to analyze company performance on natural capital factors;
- Eight of these have quantitative capabilities with natural capital datasets;
- The most common natural capital indicators on which research providers and consultants focus are GHG-emissions, water risks, climate risks and air pollution. Few methodologies focus on indicators like agricultural production and over-exploitation risks, forestry and land use and wider pollution impacts.

### 3.3 Finance and corporate natural capital accounting and reporting

We saw that financial institutions increasingly see natural capital as material to their financial performance and that they have policies to manage these. We also saw that the data and risk methodologies to do this in an appropriate way is still lacking. Here we will describe the efforts of financial institutions to overcome these shortcomings. Where the previous chapter described the role of business in developing methodologies to integrate natural capital in accounting and reporting, here we focus specifically on the role that financial institutions have played in this.

#### Promoting disclosure

We saw that it was people from the London responsible investment community that early 2000 started the Carbon Disclosure Project (CDP) as a an easy and low cost way for investors to ask for climate related disclosures. The weight behind this demand from a large number of big investors (for banks public disclosure is less relevant as they have access to information through their confidential client relationship) stimulated a quick, if still imperfect, reporting by companies.

#### Developing tools for financial risk assessment

However, it also led to complaints by companies that those financial institutions did not use this information for their own decision making. From 2005 onwards financial institutions started to do carbon footprinting of their portfolio and developed scenario's like the carbon bubble (2008).

#### Cooperating in networks with companies

Individuals from the financial sector have also played important roles in natural capital initiatives. Former banker Pavan Sukhdev led the TEEB project which gave rise to the NCC that is now chaired by Nanno Kleiterp, CEO of the Dutch development bank FMO. Several financial institutions are, or have been, member of natural capital organisations and played an active role in developing tools. Although the financial institutions that are most actively involved are generally not the large mainstream financial institutions, but rather those with an explicit public or ethical mission.

The first organisations focusing primarily on the financial sector in the context of natural capital was the Natural Value Initiative (NVI). It was set up in 2007 by Fauna & Flora International (FFI), a UK based charity. Inspiration came from a benchmark on mining companies and their biodiversity impact that proved to be of value for investors who used it in their engagement. This subsequently helped push the mining companies to improve their performance in this field as no one wanted to be on the bottom of the benchmark.

With funding of endowments the NVI was established to specifically develop a sector based approach to inform financial institutions on the natural capital impact and dependencies. The NVI engaged with large financial institutions like Rabobank, Aviva Investors, F&C Investments, Mn Services, Robeco and Syntus Achmea, as well as ethical financial institutions like Calvert Investment Management, Inc, Pax World, VicSuper and Ethix SRI Advisors. Financial institutions made suggestions and tested methodologies.

The NVI has demonstrated the materiality of natural capital, biodiversity and ecosystem services to the financial services sector as a means by which to stimulate greater private sector uptake around these values (KPMG, FFI, ACCA 2013) and created the "Ecosystem Services Benchmark" (Grigg et al. 2009), a methodology demonstrated that companies can be benchmarked with regard to their management of biodiversity and ecosystem services.

### **Starting a dedicated financial network**

When in 2012 the Natural Capital Coalition was launched amongst its around 200 members there were also some financial institutions. Amongst them the Dutch development bank FMO and Swiss systemic bank Credit Suisse. Calvert was the only financial institution that also supported the NVI that became a member of the NCC.

Also in 2012, the Natural Capital Declaration was signed by the CEOs of more than 40 financial institutions. Amongst them some financial members of the NCC, NVI members MN, Rabobank, VicSuper, the systemic Italian bank UniCredit and some emerging markets financial institutions. Note that some important financial institutions of the NVI like Aviva Investors, F&C Investments, Robeco and Syntrus Achmea did not make this transition. In 2015 Citi added as a signatory and took on a leading role in the development of a 'drought tool'.

At the launch of the NCD it was noted that "For a long time, financial institutions have looked at climate change risks as the chief issue with a material impact on loans, investments and insurance products. That landscape is changing quickly, with biodiversity loss, ecosystem degradation and water quality and availability emerging as important risk factors. At present capital markets do not sufficiently account for risks associated with unpredictable changes in ecosystems. There is a significant lag between a clear reflection of such risks and the hardwiring, notably valuation, integration and pricing of such risks into the inner working of our financial system. The NCD was borne to address these emerging risks" (UNEP FI 2012).

The financial institutions signing the NCD committed to the integration of natural capital considerations into private sector reporting, accounting and decision-making by 2020 and to integrate natural capital considerations into their loans, equity, fixed income and insurance products. To achieve this, signatory financial institutions are working to develop metrics and tools to help incorporate natural capital factors across their businesses. This is being done through four working groups, which are focusing on 'understanding', 'embedding', 'accounting for' and 'disclosing on' natural capital (NCD 2013).

The NCD is supported by a Secretariat by the United Nations Environment Programme Finance Initiative (UNEP FI) and the Global Canopy Programme (GCP). Two working groups are hosted by the FFI (the founder of the NVI) and the CDP. The NCD cooperates with the NCC as financial institutions and business share the wish to improve their understanding of natural capital risk and opportunities and ways to respectively mitigate and capitalize these.

### **From natural capital accounting to reporting**

A limited number of financial institutions has been involved in developing natural capital accounting methodologies. Mostly through contributing in kind, testing beta versions and requiring corporates to disclose their exposures. Following the cooperation around the Natural Capital Protocol a new role for financial institutions seems to be emerging as corporations and financial institutions (and NGO's) give a different priority to the reporting. This can be seen in the discussion on the application of the Natural Capital Protocol. This has amongst the primary intended applications "to help financial investors make decisions about the management of their asset portfolios" by "enabling comparisons of the sustainability of peer-group companies and their management of natural capital resources". However, in line with the preference of most of its corporate members the NCC explicitly states that the NCP is primarily meant to support better decision making, and not as a reporting framework:

“although it will aim to standardize the process for assessing impacts and dependencies on natural capital, it is not intended that it should provide absolute comparability of results for external disclosure” (NCC 2015). Most corporate stakeholders stated that “reporting externally on natural capital was not yet a corporate priority”.

## 4. The Financial Sector as an Agent of Change

Financial institutions have shown that they can be effective agents of change in the field of natural capital accounting and reporting. Frontrunners have played an active role in developing accounting methodologies, and the case of carbon accounting showed that this can be scaled up rapidly within the sector. However, both in the field of carbon accounting and with regard to the translation in suitable risk metrics and in other natural capital areas, much work still needs to be done. Governments can facilitate this through stimulating both the availability of relevant data and the use of this by financial institutions.

### 4.1 The financial sector as a new agent of change

#### From tradeoff between financial and natural capital...

When financial institutions started taking ESG aspects into consideration, the mainstream thinking was that an increased awareness of the ESG-performance of companies would lead to lower financial returns, e.g. that there is a tradeoff between ESG-performance and financial returns: preserving natural capital could only be done at the expense of financial capital. In this line of reasoning, financiers would be a conservative force, an impediment for the management of a company that wants to focus on its ESG impact, rather than an agent of change.

#### ... to a virtuous cycle

However, over recent years a strong body of evidence has been built that investments that take ESG-factors into account do not underperform financially. Actually, they may outperform primarily because they are less risky and offer new opportunities. Because of this, creditors and investors are increasingly valuing ESG efforts positively, also financially. Sustainability policies have rapidly become common amongst financial institutions in Europe and to a lesser extent the US and emerging markets.

Thus a virtuous cycle can start between the real economy and financial institutions. Where a company giving much weight to natural capital in its strategy attracts farsighted investors that support this (Eccles and Serafeim 2013) and even induces the company to pay more attention to, and report on, natural capital. As the data on natural capital grow, financial institutions can more easily take this into account. Rewarding more strongly companies that perform well with regard to natural capital, and so on.

Financiers can thus be an influential force on companies, the objects of change, inducing them to account and report on natural capital (Maas en Vermeulen 2016). This way the financial sector becomes an agent of change. A potentially effective one due to its strong position vis-à-vis companies, its intimate knowledge of the specific position of these companies and its incentive to take natural capital into account.

## Not there yet

Which is not to say that the financial sector currently univocally and optimally pushes companies for the preservation of natural capital and/or the reporting on this. In the perception of most top level management, the financial sector is still too much focused on the short term financial performance and thus actually an impediment to taking into account the long term effects of the company's operations, let alone in the field of natural capital. A short termism that has only grown stronger since the financial crisis of 2008 (Barton and Wiseman 2014).

However, despite this mixed overall picture, there are clearly some financial institutions that actively and openly push for natural capital accounting and reporting and are active members of organizations that support the development of methodologies for this and their uptake. Whereas the largest financial institutions are not amongst them, more recently some of these have also stepped forward. The momentum seems to be building.

## 4.2 Explaining the performance of the financial sector as an agent of change

Here we discuss the performance of the financial sector as a new agent of change in the field of biodiversity preservation through its role in natural capital accounting and reporting. We discuss the role that the six building blocks that PBL has identified have played and what governments can do to strengthen the financial sector in this role.

### Performance of the financial sector as an agent of change

What can be said about the effectiveness of the financial sector as a new agent of change in the field of biodiversity preservation through its role in natural capital accounting and reporting? We saw that the support of investors was an important contribution to the success of the Carbon Disclosure Project in rapidly scaling up the carbon emission reporting of companies.

Thus far however, for other elements of natural capital a similar development has not taken place. Also much remains to be wished for with respect to more forward looking risk assessment and reporting on carbon. Still, also in these fields many positive developments have taken place in both the development of the methodology as well as in its uptake by companies and financial institutions. Also here financial institutions have made important contributions.

Contributions that are also not completely visible, as much of the interaction between financial institutions and companies is taking place through their engagement, which is not a wholly transparent process.

### The six building blocks of new governance arrangements

The six building blocks that the PBL has identified for new non-governmental governance arrangements in the field of biodiversity preservation are:

#### *New partnerships and collaboration: building on co-benefits*

Collaborative efforts often depend on co-benefits. All participating actors will need to see opportunities to realize their own interests. Co-benefit scenarios are crucial, especially in the beginning stages of setting up governance arrangements. Collaboration is costly not only in terms of time and personnel, but also bears risks. Motivations to invest and participate in partnerships range from financial and political incentives to opportunities for information sharing, capacity building, implementation and rule setting (Hajer 2011, Hajer et al. 2015).

### *New disclosure mechanisms for broader accountability*

Disclosure and transparency is increasingly becoming a new norm, which forces especially businesses but also NGOs and public agencies to reveal for example their procurement strategies, supply chain management and investment practices. Through disclosure, businesses and financial institutions can be held accountable by a broader group of stakeholders. Disclosure can take many forms: certification schemes, company reporting systems, verification and auditing systems, online dissemination of information by civil society, and the availability of up-to-date online information to citizens (Linnerooth-Bayer, Vari and Thompson 2006).

### *Taking a clumsy perspective and providing room for experiments*

Clumsiness and experimentation focus on what works, learning from failure and success stories and on implementing new ideas and problem-solving approaches. Clumsiness accepts the existence of contradictory problem perceptions and solutions and tries to make the best of it by focusing on the synergies while simultaneously taking into account differences in perception. A clumsy perspective also means being able to flexibly adapt to frequently occurring and uncertain changes. Experimentation also involves daring to take risks and accept failures as a means of learning (Verweij et al. 2006).

### *Reframing and rescaling strategies*

Reframing and rescaling are crucial strategies to governing complex problems. Reframing refers to the ability to deal with multiple frames in society and policy, the ability to respond to changing agendas and public demands and the ability to unblock deadlocks and stagnations in policy processes. Rescaling refers to the capability to address mismatches between the scale of a problem and the scale at which it is governed (Termeer et al 2013).

### *Upscaling potential and entrenchment*

Impacts can be scaled up in two ways: horizontally and vertically. Horizontal scaling up refers to governance arrangements that expand coverage and size by becoming a larger platform, covering more beneficiaries and by covering a larger geographical area. Vertical scaling up refers to governance arrangements that focus on advocacy and knowledge sharing with the purpose of shaping the behaviour of other (public and private) organizations in a way beneficial to the goals of the governance arrangement (Termeer et al 2013).

### *Directionality: guidance in a polycentric governance context*

Directionality involves governance strategies to enhance coherence and order in a context of polycentrism. Directionality can be provided in different ways: via goal setting and vision building and via orchestration. Orchestration as a governance mode “in which one actor (the orchestrator) enlists one or more intermediary actors (the intermediaries) to govern a third actor or set of actors (the targets) in line with the orchestrator’s goals” (Abbott et al 2014a, p.3). In contrast to both mandatory and voluntary regulation, orchestration is an indirect mode of governance, which works through intermediaries. Leadership, agenda setting and review are key features of orchestration (Abbott et al 2014b) which renders orchestration a highly relevant governance mode for providing directionality.

### **New partnerships and collaboration: building on co-benefits**

The development of natural capital accounting and reporting methodologies has been a co creation process of many different organizations from different backgrounds: companies, NGO's , government agencies, financiers, academics and consultants. All with their own particular interest in this development.

To guard that all different interests are served in the project many organizations have been part of steering this process. The co-benefits with more general reporting institutes (GRI, IR) was established through close cooperation, through shared board memberships and the signing of memorandums of understanding.

Also some financial institutions have cooperated intensively with this community. Starting with the tools of the NVI and the membership of NCC and the NCD. The driving co-benefit is the shared interest between companies and financiers for better long term financial performance of companies through a better assessment of natural capital impact and dependencies.

By collaborating they can influence the standards that are being set. As they have done by setting standards for the behavior of companies with regard to natural capital like the Roundtable on Sustainable Palm Oil (RSPO).

All stakeholders benefit from sharing knowledge, expertise and resources as this leads to cost reduction. This is an important driver for financial institutions as well, as the financial business case of taking natural capital into consideration is still in discussion within many financial institutions. If through cooperation the cost of data gathering and methodology to assess these is brought down or the relevance (financial materiality) of this is proven, financial institutions are able to take natural capital more into account (van Tilburg, Demmers and Remmers 2016, NCC 2016)

This cooperation is possible both between similar financial institutions and between financial institutions from different sectors (e.g. like banks and asset owners). Whereas the impact of natural capital is different for different financial institutions, for instance different for banks than for investors, they share to a large extent a common interest in natural capital accounting and reporting by their client companies and for instance can use similar models and scenarios to estimate the impact on risk and return of natural capital impact and dependencies.

Whereas several financial institutions have contributed in kind in the development of natural capital accounting and reporting methodologies, the funding of the initial development of this has almost totally come from private foundations and public institutions (governments and multilateral institutions). This can be explained as being the preferred way to keep the initiative independent from specific (financial) interest. However, at least a certain share of co-funding by financial institutions can also be taken as an indicator of the benefit they see in this work, their ownership of it.

### **New disclosure mechanisms for broader accountability**

In the case of natural capital the financial sector is one of the parties pushing the 'new norm' of transparency on companies, alongside government and NGO's. However, despite the co-benefits identified above between companies and financial institutions of a better assessment of risks and opportunities of natural capital, here we also see a divide between the financial institutions and the

companies, with many companies wanting to use natural capital primarily as a tool for better strategic decision making within the firm.

The NCC is following the line of the companies on this. The main argument being that despite the steps that have been taken in developing the methodologies, further development is needed as well as additional work on interpreting adequate responses of companies. In addition, organizations first have to change their decision making to account for natural capital. The fear is that too early disclosures may push down the level of disclosure to the lowest common denominator, making reporting just a compliance issue.

Reporting on natural capital impact is especially sensitive as it is often a measure of hidden costs, and thus easily seen as a minus on the current credit worthiness and valuation of companies. It is for this reason that most of the true price or -cost studies (environmental profit and loss accounts) that have been undertaken are not publicly available.

However understandable from the point of view of corporations, the push for more transparency is set to grow as more becomes known about the materiality of it. For instance through accountants that may argue they need this in order to be able to form a trustworthy picture of the financial position of the firm concerned as they are obliged by law. Financiers may conclude that companies that are not transparent have something to hide and deserve less favorable financial conditions. Or financiers may be held liable themselves for not insisting on the reporting of material issues that, given the general state of knowledge, were clearly material. Lastly, governments and NGO's also demand more transparency from the financial sector itself. A demand that financial institutions can only fulfill if their clients are sufficiently transparent.

#### **Taking a clumsy perspective and providing room for experiments**

In the development of natural capital accounting and reporting methodologies and tools for the assessment of natural capital risk, the need to experiment has been recognized. Often this has been done by knowledge institutions working together with practitioners that through direct implementation were able to give rapid feedback that could then be used for improving the accounting methodology or tool. Stakeholder involvement has been a very important part of for instance the NCP. Through an open process all stakeholders could give their input and get to know the developing methodologies.

Whereas a clumsy perspective is to a certain extent needed in the development of methodologies, it also is a drawback from implementation in a sector like the financial, where models play such an important role, often supported by rules and regulations that oblige the use of certain models and their outcomes (for instance through external ratings). With this comes the demand for the data going into these models to be sufficiently hard.

### **The not so clumsy principles for disclosures**

As the seven principles for disclosures on climate-related financial risk and risk management that the Bloomberg Task Force has formulated show, there is limited room for clumsiness when it comes to reporting: 1. Present relevant information 2. Be specific and complete 3. Be clear, balanced, and understandable 4. Be consistent over time 5. Be comparable among companies within a sector, industry, or portfolio 6. Be reliable, verifiable, and objective 7. Be provided on a timely basis.

As the Taskforce points out, these principles are largely consistent with other mainstream, internationally accepted frameworks for financial reporting and are generally already applicable to most providers of financial disclosures.

Experimentation with different methodologies that may lead to very different outcomes for the same indicator does not enhance their trustworthiness. It is for this reason that agreement on methodologies and the consequent use of these, is important for the uptake of these in the financial sector. This may also explain why carbon accounting has become fairly widespread relatively quickly, as there was a common methodology (the GHG-protocol). Next of course, to climate change being the environmental issue that is getting most international policy attention.

### **Reframing strategies**

The different groups participating in natural capital accounting and reporting have sometimes very different frames. With companies and the financiers on the one hand primarily interested in the effects of natural capital impact and dependencies on their bottom line, and NGO's and environmental parts of governments primarily interested in the preservation of natural capital. Frames that can be aligned to a certain extent as we described in the previous section on co-benefits, but that can also differ quite strongly. The NCC has been able to keep these different groups and their different frames together and in a fruitful cooperation by consistently showing how the different frames overlap and relate.

### **Rescaling strategies**

Through natural capital accounting and reporting an effective rescaling of the often local scale biodiversity problems can take place. These local problems are often caused by multinational companies or local companies with foreign financiers. Natural capital accounting and reporting offers the opportunity to translate these local impacts into natural capital costs that can be assessed on a much larger scale.

Natural capital accounting and reporting also offers the opportunity to link the macro findings (WAVES, MAES) to the micro/meso level of the firm, sectors and financial portfolios.

### **Horizontal upscaling**

The 'horizontal upscaling' potential of natural capital accounting and reporting is very large, and arguably one of the drivers why specific financial institutions have been active in developing the methodologies. This is in the first place the upscaling potential amongst corporations. The interest with companies to assess their natural capital impact and dependencies is high, as evidenced by the over 500 companies that volunteered to do a pilot for the NCP. Through working with members that are themselves memberships or networks, a very large up-scaling potential is tapped into.

The other horizontal upscaling potential is between financial institutions. Whereas several financial institutions have been involved in developing the natural capital accounting and reporting methodologies, these represent only a small fraction of the financial sector and are generally not the large mainstream financial institutions. This shows that currently the perceived benefit for financial institutions is at least partly in the domain of ethical considerations. However, recently also larger financial institutions became signatories to the NCD. Still, there is an expectancy amongst the people involved with for instance the NCD that there is a rather large awareness for natural capital impact and dependencies amongst also the main players in the financial sector who for instance are members of UNEP FI and UNPRI. So that when the frontrunners succeed in developing relevant, easy to use and stable indicators that fit mainstream risk assessment, these will scale up within the financial sector quickly.

### **Vertical upscaling**

The 'vertically upscaling' is complementary to the horizontal upscaling. As other organizations like standard setters, policymakers, supervisors and financiers take natural capital into account this will help the horizontal upscaling. For instance if governments or supervisors make certain best practices mandatory.

### **Directionality: guidance in a polycentric governance context**

Around natural capital a clear goal was set and vision built that was attractive to a range of different stakeholders. This positive shared goal in combination with trust that has built over years and the common language developed through many (informal) meetings made the cooperation possible amongst a very heterogeneous group of organisations. The new Natural Capital Protocol (2016) is an important step in this process. To enhance coherence and order in the polycentric context of natural capital accounting and reporting the governance of shared board members and MoU's played an important role, as did collaborating in coalitions with an open process of consultation.

Orchestration in the sense of letting financial institutions induce their clients and investees to do more natural capital accounting and reporting however is not visible. The NCC actually explicitly sees reporting not as a priority.

## **4.3 Lessons for governments**

### **Financial sector as a complementary force in biodiversity preservation...**

Governments have agreed on ambitious targets for the preservation of biodiversity and thus natural capital. As of yet they are not very successful in meeting these targets. It is for that reason that the PBL analysis of empowering non-governmental agents of change may be relevant here as well. We saw that financial institutions can be important contributors in the field of biodiversity preservation through their involvement in natural capital accounting and reporting.

However, we also saw this is currently not done to the full extent possible. A large part of the financial sector is not involved and the focus is predominantly on carbon, much less on other themes like land, water and biodiversity. And even in the case of carbon the reporting on exposures and the financial risk assessment based on this is still far from complete.

How then can governments strengthen financial institutions as agents of change in the field of natural capital accounting and reporting?

### ... but no substitute for public intervention

Before we discuss the lessons for the role of government this case offers a warning. Whereas financial institutions involvement with natural capital offers clear potential advantages for biodiversity preservation, there are also clear limitations as to what can be expected from the private sector. It is often in anticipation of public interventions, through regulation and taxation, that natural capital is being taken into account by private institutions. Many elements of natural capital also have a distinctly public goods character. Whereas the profit of preventing land degradation is often attributable to a specific owner, for clean air and pollination this is much less so the case. Companies that reduce their natural capital impact and dependencies by saving on the use of virgin materials are not helped if, as a consequence of their effort and investment, the costs of their competitors that keep using that material are reduced. Natural capital accounting and reporting therefore are no substitute for public intervention. These are rather complementary, with well targeted public policies enhancing private efforts and their effectiveness.

### Increase the (perceived) co-benefit of financial institutions

Ethical considerations aside, natural capital matters to financial institutions in as far as it (potentially) translates into financial risks and opportunities. Whereas natural limits (like the exhaustion of virgin materials, water etc.) pose clear limits that may give rise to prohibitive price rises, governments themselves also play an important role in translating natural capital impact and dependencies into financial costs and benefits through for instance their regulation and taxation. Thus public policy makers can make the financial sector receptive for natural capital accounting and reporting. Through signaling credible policies to protect natural capital they can create a market price and coerce parties to cooperate.

This approach can use the ability of the financial sector to protect natural capital now, based on expectations about the future. As evidenced by the impact of the carbon bubble scenario on financial institutions: on the presumption that governments will take action to enforce the stated goal of limiting climate change, perceived risks and opportunities change. As this impacts financing conditions the financial sector actually steers the real economy in the direction of a 2-degree future. Thus future probabilities become real, through influencing the expectations of the financial institutions that through the cost of capital immediately influence behavior, changes current cost-benefit analysis of investments in fossil- and renewable energy.

Another way to increase the perceived benefit for financial institutions of natural capital accounting and reporting is through building the evidence base on the materiality of natural capital for financial institutions. Much research has been done on the financial risk and return of ESG performance. However, specifically on natural capital, apart from carbon, more research could help to increase the insight in the financial materiality of the issue. For instance, scenarios could be developed similar to the carbon bubble, that start from the assumption that stated goals with regard to biodiversity preservation will be met and show how this can be done and how this will impact specific sectors, companies and asset classes.

Through (semi) public development banks standards can be set. The multilateral development banks have shown that they can set the standard, working together with the private equator banks. The IFC performance standard 6, has had a real impact. Dutch development bank FMO is currently a frontrunner when it comes to taking natural capital into account in all its decision making.

Also regulators are an important influence. They see to it that financial institutions have a proper assessment of all material risks. Hence also the ones originating from natural capital impact and dependencies. Increasingly supervisors are looking at carbon (BoE 2015, DNB 2016) and in emerging markets also other themes (UNEP Inquiry 2015). However, looking at the large externalities in other fields a wider view by supervisors may be warranted as well.

Lastly, there is the wider issue of financial reform. Of the need to focus the financial sector more on the real economy (SFL 2011) and the long term (Barton and Wiseman 2014). A point that was raised in the context of carbon disclosures more recently by the FSB taskforce: “increasing the supply of relevant and timely information to the market will depend on whether there is sufficient demand for such data by market participants. Therefore, the Task Force will need to consider possible constraints on the demand for such information. For example, investment managers may not be properly incentivized by their asset owner clients to incorporate such information in decision-making”. Several proposals have been brought forward to make banks and asset managers more forward-looking and more conducive to ecological issues (FCLT 2015, van Tilburg, Demmers, Remmers 2016, CISL 2016).

### Promote disclosure

If the financial institutions are incentivized to take natural capital into account they will need, and thus push for, more reporting. Better data is needed on all natural capital themes. Governments can continue their role as funder for the efforts to develop methodologies and stimulate its uptake, as they have done together with foundations. This ethical and public funding source also helps to make this collaboration as open as possible, to all parties from the financial institutions as well as to knowledge institutions and NGO’s. In order to diffuse this knowledge it should find its way to education, also of accountants and finance professionals.

Given the limits that financial institutions have to coerce companies to natural capital accounting and reporting, supporting public regulation can help to make the data available. This larger uptake of natural capital accounting and reporting will in itself also be an important driver of further improving methodologies. The larger datasets will increase the use of these by the financial institutions and the sophistication of this. More data will also lead to more insight into the materiality of natural capital. This may lead to more specific recommendations on the natural capital accounting and reporting methodologies. Thus a smart interplay is needed between public and private organizations to frame the reporting requirements well.

Lastly, governments can induce the uptake of this through reporting requirements for financial institutions. Like companies, these are obliged to report on all material issues. However, there are examples (France on carbon) where reporting is made obligatory. New regulation for insurance companies also obliges them to be more forward looking, e.g. through stress tests. This has also been suggested for instance for banks (CISL 2014).

## Annex I Literature

Abbott, Genschel, Snidal and Zangl (2015) Two Logics of Indirect Governance: Delegation and Orchestration, *British Journal of Political Science*.

Access to Medicine Index (2016) Investors and access, website, accessed 22 June 2016.

Advisory Scientific Committee of the European Systemic Risk Board (2016) Too Late, Too Sudden: Transition to a Low-Carbon Economy and Systemic Risk, Frankfurt.

Atkinson and Pearce (1995) Measuring sustainable development, in: Bromley (ed.) *Handbook of Environmental Economics*, Blackwell.

Bank of England (2015) Investigation of the UK insurance market.

Barton and Wiseman (2014) Focusing capital on the long term, *Harvard Business Review*.

Borio (2012) The financial cycle and macroeconomics: what have we learnt?, *Bis*.

Burkhard, Kandziora, Hou and Müller (2014) Ecosystem Service Potentials, Flows and Demands – Concepts for Spatial Localisation, Indication and Quantification, *Landscape Online*.

Capurri (2015) The Natural Capital Declaration and Roadmap; Financial sector leadership on natural capital, UniCredit/UNEP FI.

Carbon Tracker Initiative (2011) Unburnable carbon; are the world's financial markets carrying a carbon bubble.

Carney (2016) Resolving the climate paradox, Arthur Burns Memorial Lecture.

CDP (2014) Strategic plan 2014-2016.

CISL (2016) Environmental risk analysis by financial institutions – a review of global practice, paper for the G20 Green Finance Study Group.

CISL (2015) Unhedgeable risk, Cambridge University.

Corporate Reporting Dialogue (2016) The landscape map, website, accessed September 19 2016.

Deltares (2013) Vergoedingen voor ecosystemendiensten.

Debevoise and Plimpton (2016) Environmental and Climate Change Disclosure under the Securities Laws: A Multijurisdictional Survey.

Eccles and Serafeim (2013) The performance frontier; innovating for a sustainable strategy, *Harvard Business Review*.

Ecofin (2016) Conclusions, April informal session.

Ecofys (2015) ASN Bank Carbon Profit and Loss Methodology.

Eerlijke Bankwijzer (2015) 15e Beleidsupdate, Profundo.

EFTEC (2016) Integrated reporting and Natural Capital, London: Economics for the Environment Consultancy.

European Commission (2013) Impact assessment accompanying the document: Proposal for a Directive of the European Parliament and of the Council amending Council Directives 78/660/EEC and 83/349/EEC.

European Environment Agency (2011) Common International Classification of Ecosystem Services (CICES), 2011 Update.

EU (2014) DIRECTIVE 2014/95/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014; amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups.

Friends of the Earth International (2015) Financialization of Nature.

Focusing Capital on the Long Term (2015) Long term portfolio guide.

Galaz, Gars, Moberg, Nykvist and Repinski (2015) Why Ecologists Should Care about Financial Markets, Trends in Ecology & Evolution.

Gelder, van (2016) Stranded assets in the palm oil sector, Profundo.

Grigg, Cullen, Foxall, Crosbie, Jamison and Brito (2009) The Ecosystem Services Benchmark, A guidance document, Fauna & Flora International, UNEP FI and Fundação Getulio Vargas.

Hajer, Nilsson, Raworth, Bakker, Berkhout, de Boer, Kok (2015) Beyond Cockpit-ism: Four Insights to Enhance the Transformative Potential of the Sustainable Development Goals, Sustainability.

Hajer (2011) The Energetic Society - In Search of a Governance Philosophy for a Clean Economy, PBL Netherlands Environmental Assessment Agency.

High Meadows Institute (2015) Charting the Future for Capital Markets.

Hurks, Langendijk and Nandram, (2015) How do current public Integrated Reports align with the <IR> Framework?, Maandblad voor Accountancy en Bedrijfseconomie.

Institute for European Environmental Policy (2013) Estimation of the financing needs to implement target 2 of the EU biodiversity strategy.

International Integrated Reporting Council (2013) International Integrated Reporting Framework.

Jansson, Hammer, Folke, and Costanza (eds.) (1994) Investing in Natural Capital: The Ecological Economics Approach To Sustainability, Island Press.

Kay (2012) The Kay review of UK equity markets and long term decision making.

Knegt, de (2013) Graadmeter diensten van natuur; Vraag, aanbod, gebruik en trend van goederen en diensten uit ecosystemen in Nederland.

KPMG (2015) Ready or not? An assessment of sustainability integration in the European banking sector.

KPMG (2014) A New Vision of Value: Connecting corporate and societal value creation.

KPMG, FFI and ACCA (2013) Identifying natural capital risk and materiality.

Linnerooth-Bayer, Vari and Thompson (2006) Floods and fairness in Hungary; in: Verweij and Thompson, Clumsy solutions for a complex world: governance, politics and plural perceptions, Palgrave Macmillan.

Maas and Vermeulen (2016) A systemic view on the impacts of regulating non-financial reporting, In commission of PBL Netherlands Environmental Agency.

MacArthur, E. (2013) Towards the Circular Economy.

MacLaughlin, van der Kruijf and van Dijk (2015) Biodiversity in the Spotlight? Assessing the coverage and quality of reporting on the issues of land use, biodiversity, water and product sustainability by companies worldwide, Sustainalytics, Amsterdam.

Monbiot (2014) [Put a price on nature?](#) We must stop this neoliberal road to ruin, SPERI Annual Lecture, Sheffield Political Economy Research Institute at the University of Sheffield.

Natural Capital Declaration (2016) Leading Financial Institutions to Test Lending Portfolios for Environmental Risk, [Press Release](#): Frankfurt, Geneva, Oxford, 3 May 2016,

Natural Capital Coalition (2016) The Protocol.

Natural Capital Declaration (2015a) Bank and investor risk policies on soft commodities; A framework to evaluate deforestation and forest degradation risk in the agricultural value chain.

Natural Capital Declaration (2015b) Towards Including Natural Resource Risks in Cost of Capital, State of play and the way forward.

Natural Capital Coalition (2015) The Natural Capital Protocol - Feedback Report from Business Engagement Partner Interviews.

Natural Capital Coalition (2014) Taking Stock: existing initiatives and applications.

Natural Capital Declaration (2015) Towards including natural resource risks in cost of capital; state of play and way forward.

Natural Capital Declaration (2013) The NCD Roadmap - Implementing the four commitments of the Natural Capital Declaration.

NewForesight and RVO (2015) Natural Capital and Financial Institutions –Transitioning towards a Green Economy.

OECD (2015) Glossary of Statistical Terms. Organisation for Economic Co-operation and Development.

OPAI & MVO Nederland (2014) Ondernemen in de circulaire economie nieuwe verdienmodellen voor bedrijven en ondernemers.

PBL (forthcoming) A Pragmatic Approach to Global Environmental Governance.

Puma (2016) <http://about.puma.com/en/sustainability/environment/environmental-profit-and-loss-account> .

PwC (2013) The value creation journey A survey of JSE Top-40 companies' integrated reports.

Rainforest Action Network (2012) Bankrolling Climate Disruption: The Impacts of the Banking Sector's Financed Emissions.

Rockström et al (2009) A safe operating space for humanity, Nature.

Rogers (2015) Better than boilerplate: More detailed disclosures benefit investors.

Simms (2016) It's the economy that needs to be integrated into the environment - not the other way around, The Guardian.

Schoenmaker and van Tilburg (2016a) What Role for Financial Supervisors in Addressing Environmental Risks? Comparative Economic Studies.

Schoenmaker and van Tilburg (2016b) Financial risks and opportunities in the time of climate change, Bruegel policy brief.

Schumacher (1970) Small is beautiful.

Schramade (2016) Integrating ESG into valuation models and investment decisions: the value-driver adjustment approach, Journal of Sustainable Finance & Investment.

Smith (1776) An Inquiry into the Nature and Causes of the Wealth of Nations.

SNS Bank (2016) Annual report 2015

Splash (2011) Editorial: [Terrible Economics, Ecosystems and Banking](#). Environmental Values 20 (2011): 141-145

Sustainable Finance Lab (2011) Conclusies en aanbevelingen.

Taskforce on Climate related Financial Disclosures (2016) First intermediate report 2016, Financial Stability Board.

TEEB (2010) Mainstreaming the Economics of Nature: a synthesis of the approach, conclusions and recommendations of TEEB.

TEEB (2008) An interim Report. European Communities.

TEEB (2009) TEEB for policymakers summary: responding to the value of nature.

Termeer, Dewulf, Breeman and Stiller (2013) Governance capabilities for dealing wisely with wicked problems. Administration & Society.

Tilburg, van, Demmers and Remmers (2016) Samen sterker en sneller; Agenda Maatschappelijk Verantwoord Beleggen Pensioenfondsen.

Tilburg, van (2010) Finance for innovation, AWT.

True Cost (2013) Natural capital at risk: the top 100 externalities of business, TEEB for business coalition.

True Price, Deloitte, EY and PwC (2014) The Business Case for True Pricing Why you will benefit from measuring, monetizing and improving your impact.

UN (1992) AGENDA 21; United Nations Conference on Environment & Development.

UNEP Inquiry into the Design of a Sustainable Financial System (2015) The financial system we need; aligning the financial system with sustainable development.

UNEP FI and Global Footprint Network (2012) A New Angle on Sovereign Credit Risk E-RISC: Environmental Risk Integration in Sovereign Credit Analysis.

UNEP FI (2012) Natural Capital Declaration Launch, press statement.

UNEP FI (2009) study into fiduciary duty.

UNEP FI (2008) Bloom or Bust.

UNEP (2010) Dead Planet, Living Planet – Biodiversity and Ecosystem Restoration for Sustainable Development.

UNPRI (2016) Annual report.

VBDO (2016a) Guide Natural Capital & Financial Institutions.

VBDO (2016b) Benchmark pension funds.

VBDO (2016c) Eerlijke Verzekeringwijzer.

Verweij, Douglas, Ellis, Engel, Hendriks, Lohmann, Thompson (2006) Clumsy solutions for a complex world: the case of climate change. Public Administration.

Vos, Grashof-Bokdam and Opdam (2014) Biodiversity and ecosystem services: does species diversity enhance effectiveness and reliability? A systematic literature review, Wageningen University, WOt-technical report 25.

WAVES (2012) Moving Beyond GDP - How to factor natural capital into economic decision making.

WBSCD and WRI (2004) The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, revised edition.

Weyzig, Kuepper, van Gelder and van Tilburg (2014) The price of doing too little too late; the impact of the carbon bubble on the European financial system, Green New Deal Series.

World Development Movement (2013) RBS carbon emissions up to 1,200 times higher than reported figure.

World Economic Forum (2014) Towards the Circular Economy: Accelerating the scale-up across global supply chains.

World Wildlife Fund (2014) Living Planet Report 2014: species and spaces, people and places.  
McLellan, R., Iyengar, L., Jeffries, B., & Oerlemans, N. (Eds.)

## Annex II    Abbreviations

AMI	Access to Medicine Index
CDP	Carbon Disclosure Project
CRR	Chain Reaction Research
DNB	The Dutch central bank
EC	European Commission
EP&L	Environmental Profit & Loss Account
ESG	Environmental, Social and Governance
GHG	Green House Gas
GRI	Global Reporting Initiative
IFRS	International Financial Reporting Standards
IIRC	The International Integrated Reporting Council
MAES	Mapping and Assessment on Ecosystems and their Services
MEA	Millennium Ecosystem Assessment
NCC	Natural Capital Coalition
NCD	Natural Capital Declaration
NCP	Natural Capital Protocol
NVI	Natural Value Initiative
NBA	Netherlands Institute of Chartered Accountants
PBL	Planbureau voor de Leefomgeving, Netherlands Environmental Assessment Agency
RSPO	Round Table on Sustainable Palm Oil
SASB	Sustainability Accounting Standards Board
TEEB	The Economics of Ecosystems and Biodiversity
UN	United Nations
UNEP	United Nations Environment Programme
US GAAP	U.S. Generally Accepted Accounting Principles
VBDO	Dutch Association of Investors for Sustainable Investment
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

## Annex III Glossary

Taken from the National Capital Protocol (2016).

**Biodiversity** The variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (UN 1992).

**Ecosystem** A dynamic complex of plants, animals, and microorganisms, and their non-living environment, interacting as a functional unit. Examples include deserts, coral reefs, wetlands, and rainforests (MEA 2005). Ecosystems are part of natural capital.

**Ecosystem services** The most widely used definition of ecosystem services is from the Millennium Ecosystem Assessment (MEA 2005): “the benefits people obtain from ecosystems”.

**Materiality** an impact or dependency on natural capital is material if consideration of its value, as part of the set of information used for decision making, has the potential to alter that decision (Adapted from OECD 2015 and IIRC 2013).

**Natural capital** The stock of renewable and non-renewable natural resources (e.g., plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people (adapted from Atkinson and Pearce 1995; Jansson et al. 1994).

**Natural capital impact** The negative or positive effect of business activity on natural capital.

## Annex IV Interview list

Giorgio Capurri	UniCredit, Natural Capital Declaration
Pieter van der Gaag	FMO, former Natural Capital Coalition
Mark Gough	Natural Capital Coalition
Paul Herbertson	Flora and Fauna International
Caroline van Leenders	RvO, former COP Finance and Natural Capital
Tom Maddox	Flora and Fauna International
Anders Nordheim	UNEP FI, Natural Capital Declaration
Mark van Oorschot	Planbureau voor de Leefomgeving
Cecilia Repinski	Stockholm School of Economics, former Natural Value Initiative
Nick Robins	UNEP Inquiry, former HSBC and Henderson Global Investors

Special thanks to Sander van het Foort (Nijenrode University), Martin Lok (Dutch Ministry of Economic Affairs) and Frank Wagemans (VBDO) for their comments.