

USING NATURAL CAPITAL APPROACHES TO MANAGE SHARED DEPENDENCIES

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Table of Contents

| | |
|--|-----------|
| LIST OF BOXES | 4 |
| LIST OF FIGURES | 4 |
| LIST OF TABLES | 4 |
| FOREWORD | 5 |
| ACKNOWLEDGEMENTS | 6 |
| EXECUTIVE SUMMARY | 7 |
| | |
| 1. THE BIG PICTURE: NATURAL CAPITAL MANAGEMENT, SUSTAINABLE DEVELOPMENT, AND RESILIENCE | 9 |
| 1.1 The opportunities and challenges we face | 9 |
| 1.2 Three shifts a natural capital approach provides | 13 |
| 1.3 Analytical framework used for this report | 14 |
| 1.4 Building on a strong base | 16 |
| 1.5 Contents of this report | 19 |
| | |
| 2. KEY SHIFTS ARISING FROM NATURAL CAPITAL APPLICATIONS | 20 |
| 2.1 Shift One: From measurement to value for business and society | 22 |
| EXAMPLES: SHIFT ONE | 22 |
| 2.2 Shift Two: From impacts to assets and shared dependencies | 26 |
| EXAMPLES: SHIFT TWO | 26 |
| 2.3 Shift Three: From direct site level to a broader value chain and landscape approach | 28 |
| EXAMPLES: SHIFT THREE | 29 |
| | |
| 3. SHARED SOLUTIONS AT A LANDSCAPE LEVEL | 32 |
| 3.1 Understand the broader context | 32 |
| 3.2 Diagnostic Approach | 34 |
| 3.2.1 Policy environment | 35 |
| 3.2.2 Stakeholders and networks | 37 |
| 3.2.3 Business and organizational capacity | 38 |
| 3.2.4 Industry drivers | 39 |
| 3.3 Cross-country comparison | 39 |
| 3.3.1 Diagnostic findings | 40 |
| 3.3.2 Comparisons | 41 |
| 3.4 Finding shared solutions and innovation across public-private-financial sectors | 44 |
| 3.5 Messages from experience | 47 |
| | |
| 4. DELIVERING RESILIENCE ON THE FOUNDATION OF SUSTAINABILITY | 50 |
| 4.1 Natural capital resilience and business resilience | 51 |
| 4.2 Strengthening resilience through a capitals approach | 52 |
| 4.3 Solidifying the foundational base for resilient and sustainable markets | 53 |
| 4.4 Reinforcement | 54 |

| | |
|--|-----------|
| 5. CONCLUSIONS AND MOVING FORWARD | 55 |
| 5.1 Deepen Collaboration | 56 |
| 5.2 Harmonization | 56 |
| 5.3 Additional support | 57 |
| 5.4 Embracing technology | 57 |
| 5.5 Sustainable Financing | 58 |
| 5.6 Adapt appropriate incentive mechanisms | 58 |

| | |
|---|-----------|
| ANNEX ONE. COUNTRY LEVEL DIAGNOSTIC ASSESSMENTS AND CORPORATE APPLICATIONS | 59 |
| Rwanda: The country level diagnostic assessment | 60 |
| Rwanda: The corporate application | 63 |
| Colombia: The country level diagnostic assessment | 66 |
| Colombia: The corporate application | 69 |
| Indonesia: The country level diagnostic assessment | 72 |
| Indonesia: The corporate application | 75 |
| The Philippines: The country level diagnostic assessment | 78 |
| The Philippines: The corporate application | 81 |

| | |
|-------------------|-----------|
| REFERENCES | 84 |
|-------------------|-----------|

List of Boxes

| | |
|---|----|
| Box 1. Key concepts | 11 |
| Box 2. The four corporate applications | 15 |
| Box 3. Learning from climate change | 18 |
| Box 4. Complementary approaches | 19 |
| Box 5. Informing environmental policies through environmental economic approaches | 35 |
| Box 6. Providing data companies need: SEEA, WAVES, and remote sensing | 45 |

List of Figures

| | |
|---|--------|
| Figure 1. Water catchment landscape | 12 |
| Figure 2. Natural capital shifts leading to resilient and sustainable markets | 21, 51 |
| Figure 3. Valuation of impacts in HUGO BOSS's overall value chain | 23 |
| Figure 4. Breakdown of values to Bacuit Bay stakeholder groups, with three management options | 25 |
| Figure 5. Land- and seascape zonation map used in the Philippines assessment | 30 |
| Figure 6. Natural capital elements of the diagnostic tool | 34 |
| Figure 7. Platform network analysis | 37 |
| Figure 8. Natural capital diagnostic tool by element and component | 38 |
| Figure 9. Network and platform mapping: Rwanda | 42 |
| Figure 10. Illustrative stakeholder mapping: Rwanda | 43 |

List of Tables

| | |
|---|----|
| Table 1. Examples of natural capital risks and opportunities for business | 17 |
|---|----|

Foreword

The world's natural capital and the ecosystem services it provides supports business and economies, both directly and indirectly. Nature's current decline underpinned by unsustainable consumption and production patterns, demographic shifts, deforestation and land use change, among others is a clear risk to business, markets and society. The value of natural capital has been neglected and largely invisible in private sector decision making, impacting nature's capacity to continue providing the ecosystems services business and society need. This report underscores the urgency of action and shares ways that companies can use natural capital approaches to build sustainability and resilience in their own business, while also helping to make markets more sustainable and resilient.

This report could not come at a more opportune time as we face a myriad of natural, social, economic and equity challenges. The global pandemic causes people everywhere to consider what is important to them and governments have stepped in with funding and incentive mechanisms the likes of which we never would have imagined.

The connection between nature, people, and the economy has been underscored so clearly as to have become indisputable. We have to evolve in the way we account for these interactions and quickly.

We know that the private sector, and sustainable and resilient markets, rely on natural capital. Building markets that consider natural assets and the services they provide is essential for sustainable businesses, economies, and societies. We can also clearly see the importance of building resilience to shocks and stresses such as climate change or a global pandemic in the way we think about the values of nature.

The report explores three shifts taking place in the relationship between business and nature and how businesses are integrating these shifts strategic and operational decision-making. The third shift, around taking a landscape approach, is especially important. Nature is a shared asset amongst many stakeholders—ensuring that natural capital is available in the long term will take a systemic approach that involves all elements of society.

Collaboration has been essential in the development and implementation of this project. From global to local experts and many others in between, we would like to thank all the people who have given their time, inspiration, and effort to help identify, test, and better understand the shifts and recommendations presented in this report.

While this report doesn't have all the answers, it is an important stepping stone. We look forward to seeing an acceleration in capitals thinking inspired by this report, and an evolution in all parts of the economy from better understanding our dependency on natural capital.



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Executive Summary

Natural capital approaches, the focus of this report, are an essential way for businesses to understand their impacts and dependencies on nature and, by so doing, to build more sustainability and resiliency into their operations.

As this report and supporting literature shows, the evolution in business, where companies interact with nature and the services nature provides in a more informed way, has co-benefits beyond a company's individual footprint. This evolution represents a shift that can stimulate other businesses in the market to engage differently with nature and also encourage other stakeholders, such as government and institutional partners, to provide the framework and supporting services to catalyze broader market uptake of similar practices. By adopting natural capital approaches, businesses strengthen their risk management decision-making, identify and implement new practices to help mitigate risks. They can also capture opportunities such as through new technologies, that can help build resilience to shocks and stresses. A deeper understanding of the natural capital context, including business dependencies on the services provided by natural capital, provides a clear impetus for businesses to manage key dependencies and build resilience.

This report explores both the business case for natural capital and how businesses and stakeholders can work together to manage risk and recognize opportunities. First, the report considers three shifts taking place in the relationship between business and nature and how businesses are integrating these shifts into their decision-making and operations. The report includes several private sector examples across a range of industries and markets. The shifts are explored and elaborated upon in detail throughout the report.

- **Shift one**—from measurement to value for business and society—recognizes the increased application of environmental economics and natural capital valuation in businesses such as Roche, HUGO BOSS, and Espadan Corks.
- **Shift two**—from impacts to assets and shared dependencies—discusses the growing awareness of businesses' dependency on nature, providing a different way to look at business risk, and how financial institutions such as BNP Paribas Asset Management, ACTIAM, and the financial-sector initiative Natural Capital Finance Alliance have internalized these exposures in their portfolio management.
- **Shift three**—from site-level operations to a broader value-chain and landscape approach—recognizes the interactions between businesses and the landscapes and economic value chains in which they operate, through the lens of nature. Businesses such as Mondi and Karingani Game Reserve have used the context of natural capital to better identify the risks and opportunities they are exposed to while Olam, Ten Knots, and the Wood Foundation Africa have used this knowledge to identify solutions across market actors at a landscape level.

This report presents a structured approach to help businesses better understand their operational footprint and broader linkages in the context of natural capital. This is especially important in complex markets where there are complicated natural capital dependencies and where a large number of stakeholders might be active or dependent on services provided by nature. This knowledge can help businesses identify solutions, especially at a landscape or seascape level.

At times, solutions that derive value for the business and support longevity of the natural asset can only be created by acting jointly with others in a landscape or market. This was a key finding across four natural capital

applications by businesses in Rwanda, Indonesia, the Philippines, and Colombia. The context in these countries varied significantly, providing examples and confirming the feasibility of a natural capital approach in countries at different levels of development and with different economic sector profiles. For example, to ensure an appropriate supply of water for agriculture, especially under climate change and water stress, or to ensure protection of coral reefs for tourism, a solution may be beyond an individual company's responsibility and capacity to address. It may require watershed-level solutions or contour planting on steep slopes on the one hand, or work across multiple companies and the public sector in a tourism market on the other. In these instances, a comprehensive understanding of the context is critical to identify priority actions, relevant stakeholders, and the broadest array of potential financing sources—all of which are needed to build shared solutions. These corporate applications are included throughout the report and presented in more detail in Annex 1.

This structured approach to natural capital can also be useful for development finance institutions and governments. These actors can broaden market adoption of natural capital approaches by strengthening the enabling policy and regulatory environment, demonstrating the business case and using voluntary industry standards, and building institutional capacity to support businesses who want to use a natural capital approach—and in turn build market sustainability and business resilience. Broadening adoption will require a better understanding of shared industry challenges, the policy environment and relevant programs, the availability of financial instruments, stakeholders, tools, and capacity, and knowledge of what competitors are doing to successfully adopt natural capital practices to integrate sustainability into business. Section 3 of this report presents a diagnostic tool to collect this information and then compares results from the different contexts in four countries: Rwanda,

Indonesia, the Philippines, and Colombia. The report then highlights opportunities in these countries to strengthen the broader market context influencing adoption of natural capital practices across the private sector.

The report concludes that, in light of economic and environmental trends, it is urgent that businesses and markets adopt natural capital thinking to build their resiliency in a world of increased environmental pressures, changing market dynamics, and heightened accountability.

The global community can help shift markets towards this sustainable and resilient pathway through six highlighted actions:

- Deepen collaboration, through establishing networks and sharing best practice.
- Harmonize technical approaches to natural capital, through frameworks and standards. This is particularly important for increasing dialogue between public, private, and financial sectors.
- Provide additional technical support through capacity building, education, and support for small and medium enterprises that may not have access to needed resources.
- Increase access to technology, particularly around natural capital management and data processing.
- Advance sustainable financing and the growth in green investment mechanisms.
- Develop and use incentive mechanisms to help motivate businesses to start assessing their relationship with natural capital and prioritize resilience.

Annex 1 of this report offers more detail on the corporate applications delivered in the four focus countries, offering a summary of the corporate application and the country level diagnostic and solutions.

1. The Big Picture: Natural Capital Management, Sustainable Development, and Resilience

1.1 The Opportunities and challenges we face

Fifteen years ago, businesses were just beginning to understand what a carbon footprint was (Safire 2008), much less thinking about how to appropriately account for and report on one.

Today, understanding carbon footprints and accounting for them has gained traction across industries. Corporate leaders are not only looking for ways to transition to a low-carbon future, they have expanded their understanding of business risk and opportunities to include a wider range of environmental externalities (as assets and risks).

Several businesses have internalized some of these natural capital risks and opportunities into core business decisions—both qualitatively and quantitatively—with a subset seeking to understand the shared value of these assets with society both locally and globally. Fast forward another ten years, and the world is likely to have seen an evolution where business will better balance the environment and human, social, and economic assets (i.e., the capitals) and their intersections holistically. These business practices will be essential in transforming markets and driving towards a sustainable future.

Along the way, various initiatives aimed at transforming economies have taken and will continue to take place. Commitments to a low-carbon world, starting with the first World Climate Change Conference in 1979,

and the establishment of the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, and the Paris Agreement in 2015 have led to joint initiatives and actions to reduce carbon emissions. In 2017, businesses and governments gathered at the Sustainable Development Impact Summit to reaffirm the importance of long-term perspectives that put environmental and social sustainability at the center of decision-making.

The Sustainable Development Goals (SDGs) continue to drive systematic and collective action towards a sustainable and resilient future. Development finance institutions such as the International Finance Corporation (IFC) launched efforts in 2018 to focus on how to create new markets and contribute to improvements in how markets function to deliver sustainable development impact. Important elements of this market transformation, irrespective of industry or sector, include sustainability and resilience. These elements are essential in any market as opportunities emerge—such as technological advances, productivity gains, and the growing middle class—and also essential for dealing with disruptions that quickly change the landscape for businesses. This report is a step on the path to a more sustainable and resilient future by shining a light on the role that businesses can play when they shift their mindset to long-term viability based on natural capital, and increasingly a capitals approach.

Natural capital approaches, the focus of this report, are an essential tool to manage sustainable

business operations, economic growth, and the shared value derived by society (box 1). For instance, the benefits, or ecosystem services, generated by natural capital assets include products such as food, water, and wood, natural regulating functions such as flood control, soil formation, and waste assimilation, and cultural benefits such as recreation and spiritual values. For businesses, these services provide critical inputs and functions to support ongoing production and supply chain operations. The same services are shared by multiple stakeholders, providing numerous additional benefits. As this report and the literature show, the businesses that recognize natural capital and act on it are in a much stronger position to identify and capitalize on opportunities. The actions of business can help build market sustainability and resilience alongside the actions of other key actors—government, financial institutions, and society.

Yet, the global context of ongoing depletion of natural capital, some of which is irreversible, challenges the natural capital base and sustainability of markets that depend on this base. Declines in quantity and quality of capitals are due to a variety of pressures ultimately linked to overexploitation, social inequality, the undervaluing of resources, and climate stresses and shocks that escalate market volatility. Of the top ten global risks for 2019 identified by the World Economic Forum, seven relate to natural capital, either directly or indirectly (WEF 2019). For businesses to thrive and contribute to sustainable and resilient markets, these risks cannot be ignored and require businesses to anticipate change, adapt, and ultimately build more resilient value chains and markets, in particular to withstand future shocks and stresses around climate change and natural resource issues.

The decline in natural capital continues to be well studied and documented, featuring in assessments such as the Millennium Ecosystem Assessment (MA 2005), Global Biodiversity Outlook 4 (CBD 2014), Inclusive Wealth Report (UNU-IDHP and UNEP 2014), IPBES Global Assessment (IPBES 2019), and the current Global Biodiversity Outlook 5 (2020). The World Bank Group's Changing Wealth of Nations (2018) suggests that between 1995 and 2014, there has

been an overall global growth in natural capital assets relative to other capitals (social, human) of one percent. But this only relates to a subset of natural capital and includes agriculture, metals and minerals, and fossil fuels, which all can lead to significant losses in other forms of natural capital. While forests and protected areas are included, wider biodiversity and water resources are not, thus the value of many associated regulating and cultural ecosystem services goes unaccounted for. Furthermore, the Changing Wealth of Nations reveals that certain parts of the world show a decline in natural capital (e.g., sub-Saharan Africa, East Asia, and Pacific and South Asia), while other parts, notably the Middle East and North Africa, have increased natural capital significantly due to growth in fossil fuel reserves, which for many is contentious.

As demand for natural capital and the services it provides grows, the most accessible sources and sites are being used up quickly and unsustainably. As a result, businesses have to operate in more remote locations and areas previously set aside for conservation. Similarly, what were once remote wilderness areas and relatively pristine eco-tourism destinations are now being developed for real estate and mass tourism. Existing operations are being exploited more intensively than before, at a rate that outpaces natural cycles of recovery and regeneration. This ever-expanding use of natural capital resources results in the demise of habitat, biodiversity, and ecosystem services.

Climate change is a significant driver of habitat and natural capital loss, with serious consequences for markets dependent upon impacted services. Unpredictable shocks further complicate and can interrupt the sustainable supply of ecosystem services. The intensity and frequency of climate impacts results, for example, in greater variability in rainfall, temperatures, and winds, and greater probability and intensity of storms, floods, droughts, and coral bleaching. Yet conserving and enhancing natural capital can help to reduce greenhouse gas emissions and to moderate the continued impacts from climate change.

BOX 1 • KEY CONCEPTS**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 (Natural Capital Coalition 2016).

Natural capital as a shared dependency

A new way of thinking about natural capital, highlighted by this report, as a set of resources which multiple stakeholders jointly depend upon for a range of benefits.

Ecosystem services

Flows of benefits that people gain from the environment and its associated natural capital.

Landscape approach

According to WBCSD, a landscape approach stems from the fact that business land uses are part of a wider landscape in which different land uses (and users) rely on the same natural resources and functions for their activities (WBCSD 2016). They are thereby interdependent and affect each other. Addressing sustainability challenges through a landscape approach involves reconciling conflicting or competing land-use interests within a geographical boundary (e.g., supply region, watershed, or concession) and working towards an integrated land management

approach, considering both the natural environment and human systems. Landscape approaches recognize that long-term business sustainability is tied to healthy communities and ecosystems. It therefore goes far beyond training and certifying suppliers or addressing impacts on particular operational sites. This means that a landscape approach is by default a multi-stakeholder and cross-sectoral process or strategy that can help achieve diverse sustainability goals. Interchangeable with “integrated landscape management,” see box 4.

Multi- and integrated capitals

A capital is a resource or asset that stores and provides value to people. When invested in and managed responsibly, the asset creates value. Capitals are commonly conceptualized as natural, social, human and produced capital. Better decisions can be made through undertaking integrated capitals assessments that adopt a systems-based approach and consider the inter-connections between all capitals (Capitals Coalition 2020).

Tensions from shared natural capital dependencies by multiple stakeholders can lead to conflicts and an escalating decline in natural capital in a landscape—potentially undermining markets. For example, water in a watershed catchment is used by different industries, farmers, households, and wildlife. Coastal resources such as coral reefs are used by fishermen and tourism companies as well as wildlife and interconnected habitat. If this is not well managed, overuse can lead to permanent depletion of the underlying natural capital asset base, and the demise of the market and benefits it provides across stakeholders. In this context, businesses, and market participants more broadly, need to fully understand their shared dependencies on natural capital.

This issue is particularly relevant across a connected geographic area such as a catchment, landscape,

or seascape (see figure 1), as activities based on the use of natural resources (such as renewable energy sources, water, and fertile land) tend to be geographically focused. Landscapes often host multiple private entities and investments and a range of different stakeholders that use and depend on the same assets. The status of the natural resource base and the pressures upon it are constantly changing over time, sometimes predictably, and sometimes less so. Understanding how and why changes occur is important, as is engagement with other stakeholders that interface with the same natural capital. Business cannot rely on local governments alone to resolve problems. It is essential that all potentially affected stakeholders, especially businesses, collaborate to resolve these issues through shared solutions and in turn create sustainable landscapes.



Figure 1. Water catchment landscape.
 Source: WBCSD 2015.

Natural resource management challenges are not new, and they continue to escalate. Numerous approaches and tools have been developed over the past few decades to help address them. These include site-level environmental management systems, environmental impact assessments, life cycle assessments (LCAs), and water stewardship schemes. Businesses have employed various certification programs to enhance sustainability in their supply chains. Some governments have implemented integrated catchment management, for example, for river catchments, landscapes, and coastal zones, and landscape habitat restoration schemes are also beginning to be implemented. In addition, the financial sector provides incentives through risk management or finance to support innovations, such as green bonds or conservation finance.

While some of these approaches have been effective in pursuit of their intended purpose, they are not always coordinated in such a way to drive towards a longer-term sustainable and resilient use of natural resources within and across markets. The World Bank notes that one of the biggest remaining gaps is the lack of accounting for environmental and social impacts incurred by businesses in the marketplace. Often referred to as “externalities,” these impacts may have significant negative (or positive) implications for other businesses and stakeholders, but because they have no market price these implications are often missed (World Bank 2012). While some externalities—especially those related to negative impacts—are addressed in part through regulatory requirements or industry standards, many more are not identified or dealt with. Thus, often these externalities are effectively invisible in decision-making processes. As a result, markets do not provide the right signals and incentives for businesses to drive full consideration of their impacts or dependencies on nature. A natural capital approach helps to bring these externalities to light and shift market actors to a more sustainable and resilient course of action.

1.2 Three shifts a natural capital approach provides

Over the past few years, many businesses have started to use natural-capital-based approaches to strengthen the business case for action (Natural Capital Coalition 2018). Through such approaches, businesses can, at a landscape level, identify shared solutions that promote sustainability and resilience and influence markets. At the nexus of the recognized importance of natural resources for business, increasing pressures on the supply of natural capital assets and services, and technical advances in the maturity of natural capital assessments, there are three observable shifts taking place:

Shift one: From measurement to value for business and society. In this shift, natural capital thinking allows businesses to recognize that the environment is something that can be valued from both a business and societal (or stakeholder) perspective. More than simply measuring numbers, natural businesses have found a powerful way to inform context and trade-offs through adopting a 'value-'based approach. On the one hand valuation requires context-based thinking, and on the other, it provides additional information for improved decision-making. Business and society are more likely to make significant changes to decision-making when there is a clear understanding of the relative importance and worth of something (i.e., its value). These values can be expressed in qualitative, quantitative, or monetary terms.

Shift two: From impacts to assets and shared dependencies. In this shift, natural capital thinking encourages businesses to see the environment as something they depend upon that is critical to their long-term viability, rather than something they impact upon which needs to be mitigated or managed. Whereas impacts may be considered at arm's length, a material business dependency is critical and requires action. What is becoming more apparent and helping to drive solutions is that dependency on natural capital is more often than not a shared dependency with other stakeholders who also value and depend on the same natural resources.

Shift three: From site-level operations to a broader value chain and landscape approach. In this shift, natural capital thinking highlights the interconnectivity between issues, stakeholders, and initiatives within a wider geographic area than just a business's direct site-level operations. This landscape perspective enables businesses to find options for responding to natural capital dependencies and impacts that are beyond their ability to implement alone. Businesses have found that a landscape-level approach can optimize the sustainable use and development of resources over time, based on multiple stakeholder interests and requirements. This shift also takes into account the cumulative impacts of multiple actors in an area and enables shared solutions.

A natural capital lens can also help businesses to develop important relationships across stakeholders that can strengthen a global value chain or contribute to a more sustainable market.

1.3 Analytical framework used for this report

The findings in this report are derived from the application of the Natural Capital Protocol (Natural Capital Coalition 2016) across multiple businesses and industries around the world during the period 2015 to early 2019 and supported by IFC's Natural Capital Advisory Program. The scope includes corporate products and projects, national and global operations,

and the value chains of products and businesses. The detailed methodologies used in each of these applications differed as needed for the business objectives and situation. Data were collected on the challenges and successes of applications and a number of participants and technical consultants provided expert interviews.

Four corporate applications were also undertaken that include, for the first time, the important and often missing national and landscape context. This context includes the state of the overall market within a country on the one hand, and important interrelations and dependencies on the other. The countries included were Rwanda, Colombia, Indonesia, and the Philippines. These country-based corporate applications are introduced in box 2 and feature throughout the report, with further details provided in section 3 and Annex 1. These corporate applications were invaluable in helping to identify and understand the three key shifts. In addition, the corporate applications were able to emphasise the context within which these businesses were operating, and identify solutions that could build more sustainable benefits and resilience, as well as ways to help move the market to consider natural capital.

A diagnostic tool was developed and used in the four countries to understand the state of the market related to natural capital adoption and the supporting environment. For a business, this tool provides information to understand the operational context as it works to find shared solutions at a landscape or market level or to influence other market actors. Local stakeholders were engaged in the process to identify solutions and determine what capacity might be available at the local level. For other stakeholders such as local or national authorities, industry associations, and NGOs, this tool assesses natural capital uptake in the relevant market and provides insights on the strengths and gaps to catalyze their further adoption. The tool also facilitated discussions among competitors and stakeholders in the market around shared dependencies and ways to take local action.

Numerous global and local workshops were organized to draw upon the broader experiences across partners (public, private, and financial). This includes a series of policy fora and conferences with the World Bank-led Wealth Accounting and Valuation of Ecosystem Services (WAVES) program (2020), the World Forum on Natural Capital (2017), the Natural Capital Coalition's Government Dialogue (2020), in-country

workshops and focus groups, and others. Feedback from these was captured through roundtables, panel sessions, structured interviews, and discussions. Workshops helped to inform linkages and synergies across topics that might otherwise appear unrelated. As these were held throughout the application period, inputs were used to refine the approach and the supporting diagnostic tools.

The findings and insights of this report are underpinned by extensive literature reviews and draw upon earlier efforts—such as The Economics of the Ecosystems and Biodiversity's TEEBAgriFood Scientific and Economic Foundations report (TEEB 2018)—and from engagement with a range of peer reviewers and technical experts.

Corporate application relied heavily on the Stages and Steps of the Natural Capital Protocol framework, informed by local insight and data. The delivery team visited each of the operations of each corporate partner and undertook each part of the process in direct consultation with the business and its local stakeholders. The corporate assessment also included some tailored aspects, adapted from the Protocol to provide more detail in three important areas:

- (a) value-chain analysis to give extra visibility to natural capital impacts and dependencies occurring along the value chain, with a full stakeholder mapping exercise and quantitative data gathering.
- (b) a landscape analysis to better understand the range of stakeholder interests and uses of natural capital in the region where the corporate partner operates. This includes identifying the other stakeholders using the natural capital, conducting interviews, and assessing the economic extent of these uses.
- (c) smallholder analysis translates all the findings from the value-chain and landscape analyses to a smallholder perspective. Using economic data and stakeholder consultation, the delivery team were able to propose opportunities for smallholders to manage and sustain their own relationship with natural capital.

BOX 2 • THE FOUR CORPORATE APPLICATIONS

Rwanda: The Wood Foundation Africa and Tea

The Wood Foundation Africa (TWFA) is an impact investor set up by Sir Ian Wood in 2007. TWFA undertook a natural capital assessment to investigate its tea value chain in Rusizi District. The assessment adopted a landscape-level approach to cover their Shagasha tea factory, two tea cooperatives, and their smallholder farms. Optimum management scenarios were assessed based on contour planting, converting annual crops to tea, soil erosion management, and fuelwood plantations. Potential climate change implications from increased intensity of rainfall and associated soil erosion were included in climate change scenarios. Shared solutions were considered in terms of the potential to introduce payments for ecosystem services to reduce soil erosion impacts on downstream water quality.

Colombia: Nespresso and Coffee

Nespresso is an autonomous globally managed business of the Nestlé Group that produces coffee-making machines and coffee capsules for domestic and business users. Nespresso applied the Protocol to coffee suppliers in two areas within Colombia: one area where farmers already implemented the Nespresso AAA Sustainable Quality Program and used water-saving technology, and one area where they did not. The assessment explored the value of benefits gained to both the suppliers and Nespresso as a result of the on-site water savings. The implications of climate change shocks were factored into the assessment through determining water-saving costs and benefits in scenarios with and without water scarcity.

Indonesia: Olam and Coffee

Olam is a global agribusiness supplying food and industrial raw materials to clients worldwide. Olam undertook an assessment to identify how best to support farm suppliers in the Karo region of North Sumatra to ensure long-term sustainable production. The assessment investigated the costs and benefits of alternative soil, water, and agroforestry management options. Values were estimated in scenarios of ash deposition from volcanic eruptions and climate change shocks in the form of droughts over the coming 10 years.

Philippines: Ten Knots Group, Small and Medium Enterprises (SMEs), and Tourism

Ten Knots is a Philippine hotel resort company with four island resorts and four mainland resorts on the island province of Palawan. Supported by the Palawan Council for Sustainable Development (PCSD), the company undertook an assessment to explore how improved management of the El Nido terrestrial and marine protected area could enhance the profitability and long-term sustainability of tourism. Ten Knots Group investigated the costs and benefits for resorts, dive and tour boat operators, fishers, and government associated with three alternative management scenarios. The financial implications of each scenario were predicted in relation to changes to coral reef extent and quality, water quality, and fish stocks over a 20-year period, and potential climate change shocks from increased storm damage to corals, coral bleaching, and rainfall runoff.

1.4 Building on a strong base

This work builds on an evolution over several decades in how businesses integrate environmental impacts into business decisions. Today sophisticated markets and businesses therein have strong fundamentals in place on which they can build a more holistic approach to natural capital impacts and dependencies. As more market participants build awareness and enhance skills, business experience can demonstrate the value to catalyze markets toward greater levels of sustainability and resilience. This section summarizes key pieces of this evolution.

For business, earlier emphasis was on environmental and social risk management, underpinned by a variety of private sector environment-related approaches developed for different aspects of business management. This includes Environmental Impact Assessments for major development projects, Environmental Management Systems for managing operational sites, environmental standards for dealing with air emissions and discharges among others, life cycle assessments to evaluate environmental impacts of products and materials including along the value chain, sustainability certificates (e.g., Fairtrade, Marine Stewardship Council, Rainforest Alliance) to ensure products such as coffee, sugar, bananas, and fish come from a sustainable source, and environmental and social standards for assessing risk. Various sustainability reporting initiatives provide additional accountability for improving sustainability practices;

initiatives include, among others, the Global Reporting Initiative (GRI) established in 1997, the International Integrated Reporting Council's (IIRC) Integrated <IR> Framework (IIRC 2012), and the Sustainability Accounting Standards Board (SASB) founded in 2011. Each of these adopts a performance-based approach and uses quantitative metrics around a business's direct measurable impacts on the environment. Many of these initiatives have been useful for measurement and disclosure particularly and are coupled with industry-specific transparency and disclosure efforts. Offshoots of natural capital accounting are being integrated into some of these initiatives.

Into this expanding landscape, many businesses have emerged as willing pioneers and leaders. The business case for doing so comprises reputational, financial, operational, and legal risks and opportunities (table 1). Standards and frameworks have introduced quantitative comparability to the practice of sustainability and thus attracted those businesses who wished to define themselves to similarly-motivated stakeholders. Now, as practices mature, integration deepens, and expectations rise, business leaders are investing resources in maintaining their positions as green or ethical performers. Sustainability is now an industry in itself, spanning from compliance to more innovative leadership. The proliferation of standards has led to a lack of standardization, posing a challenge for companies and stakeholders.

Table 1. Examples of natural capital risks and opportunities for business
 Source: Adapted from *Natural Capital Protocol* (Natural Capital Coalition 2016)

| CATEGORIES OF NATURAL CAPITAL RISK AND OPPORTUNITY | POTENTIAL RISKS | POTENTIAL OPPORTUNITIES |
|--|---|---|
| Operational | Costs of natural disasters, security costs from conflict over natural resources, increased cost of raw materials, less predictability of supply chains. | Reduced costs of green infrastructure in nature-based solutions, efficiency gains, recapture value of wasted materials. |
| Legal and regulatory | Increased compliance costs, production losses due to permit denials, increased fines or penalties, higher license fees. | Reduced compliance costs by using resources more efficiently, expedited permit process, reduced legal costs by anticipating and avoiding negative impacts, influence government policy. |
| Financing | Higher interest rates or harsher financing conditions, stranded assets, non-performing loans. | Gain or maintain investor interest and confidence, improved access to finance such as “green” funds. |
| Reputational and marketing | Changing customer values and preferences, reduced market share, lower staff retention, reduced loyalty of key suppliers. | New revenue streams from emerging environmental markets and products (such as carbon credits), demand for certified products, market differentiation and premiums for “green” products, higher staff retention. |

Governments have long had a focus on protecting their country’s natural resource base. For instance, the Convention on Biological Diversity was initiated in 1992 at the United Nations Conference on Environment and Development (the Rio “Earth Summit”). In 2010, world governments agreed to the 20 Aichi Biodiversity Targets that were set for 2020 and are now being updated. At the country level, governments have different natural resource management policies, programs, and projects to protect the environment and achieve agreed international goals. These have often entailed land-use planning, integrated river basin and coastal zone management plans, integrated landscape management, and more recently landscape-restoration-based approaches. Countries are also progressing in developing statistical accounts to improve data on biodiversity and natural resources within a country, such as through the UN SEEA (System of Environmental-Economic Accounting) framework (United Nations 2014). SEEA integrates economic and environmental data to provide a more comprehensive view of the interrelationships between the economy and the environment and changes in stocks of environmental assets.

More recently inclusion of natural capital in national accounts has gained traction. By providing crucial information on the value of the stock and flow of natural resources, natural capital accounting can be a powerful tool for policymakers grappling with trade-offs in a growing economy. This is particularly important in developing countries where natural capital forms such a large share of their total wealth, for example 47 percent for low-income countries (World Bank, 2018). The World Bank Wealth Accounting and Valuation of Ecosystem Services partnership (WAVES) seeks to ensure that these efforts are mainstreamed in development planning and national economic accounts. Comprehensive wealth accounting can provide an estimate of the total wealth of nations by measuring the value of different components of wealth (i.e., capital stocks) to ascertain whether a country is growing its income without depleting its stocks. Changes in a nation’s wealth are measured through adjusted net savings (ANS) which captures the real difference between production and consumption by including depreciation of fixed capital, investment in human capital, and also, importantly, depletion of natural resources and damage from pollution.

In-country institutions and platforms have also formed to provide the services, research, tools, and platforms that can help markets shift to greater levels of sustainability. Roundtables, associations, and multi-stakeholder platforms have been instrumental over the decades and across issue areas to catalyze change. In addition, financial institutions have played an important role. Much of the focus has been on environmental risks. For example, IFC's Performance Standards and the broader Equator Principles (EPs) are risk management frameworks for assessing and managing environmental and social risk in projects. There are also similar environmental standards used by other development finance institutions (DFIs) and export credit agencies. Financial institutions are also looking for opportunities and bringing innovative products and services to the market that can further market transition. Impact

investing that seeks to achieve positive economic, social, and environmental returns is also on the rise. Natural capital applications and approaches can add value to this evolution.

The climate arena provides a window into how private sector businesses, banks, government, and institutions can bring about positive market-level shifts and innovation (see box 3). The narrative also reveals how natural-capital thinking has closely followed the evolution of climate change policy and how the four elements of markets—business, financial sector, government, and institutions—need to move together to see a durable shift in the market toward sustainability and resilience. Box 4 highlights other concepts that very much complement a natural capital based approach.

BOX 3 • LEARNING FROM CLIMATE CHANGE

Insights and parallels into how the private sector engages with natural capital can be drawn from reviewing how the carbon and climate change management space has evolved. Both climate and natural capital had UN Conventions established in 1992: the UN Framework Convention on Climate Change (UNFCCC, ratified in 1994) and the UN Convention on Biological Diversity (UNCBD, ratified in 1993). The UNFCCC was in part instigated by the International Panel on Climate Change (IPCC) which was set up in 1990, whilst a similar body founded in 2012 covers natural capital, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The Stern Review (Stern 2007) was an internationally acclaimed investigation into the effect of climate change on the world economy. Its natural capital equivalent, The Economics of Ecosystems and Biodiversity (TEEB 2010) had a similar remit. Both reports acted as an instrumental base for the work that followed. The first Greenhouse Gas Protocol for corporate accounting and reporting came out in 2004 (WRI and WBCSD 2004), whilst the Natural Capital Protocol was released in 2016 (Natural Capital Coalition 2016).

Various forms of carbon trading and markets have developed since the Kyoto Protocol in 1997, including the Clean Development Mechanism (operating since 2001) and the EU Emissions Trading Scheme (from 2005). In comparison, payment for ecosystem services schemes (see box 4) were first set up in the 1970s, with more intense uptake of watershed-, water quality-, and biodiversity offset-related payment schemes and markets occurring in more recent years (Bennett et al. 2017).

The Carbon Disclosure Project (now CDP) started tracking corporate carbon reporting in 2002. This was followed in 2014 by CDP Water, tracking corporate reporting on water, and later forestry and supply chain reporting under separate CDP initiatives. More recently, the Task Force on Climate-related Financial Disclosures (TCFD) was set up in 2017 to help businesses understand and align to what financial markets want from disclosure in relation to measuring and responding to climate change risks. The TCFD is beginning to get good traction, and it seems inevitable that the approach will be extended to natural capital, or an equivalent task force will be put in place soon.

In fact, many of the risks around climate change are closely linked to and interact with natural capital (e.g., water availability and ecosystem regulating services such as flood control). We should not see climate change and natural capital as separate challenges, but rather connected, interdependent issues that can learn from each other.

BOX 4 • COMPLEMENTARY APPROACHES

There are several concepts and terms for mechanisms which complement and enforce a natural capital approach. All are applications of natural capital thinking and could be employed as the result of a natural capital assessment.

Payments for ecosystem services (PES)

Schemes in which the beneficiaries, or users (buyers), of ecosystem services provide payment to the stewards, or providers (sellers), of ecosystem services (DEFRA 2013). Businesses can be either buyers or sellers in PES schemes.

Nature-based solutions

Actions that work with and enhance nature to help address societal challenges (Nature-based Solutions Initiative 2020). The Nature-based Solutions Initiative states that “Nature-based solutions can be used as an ‘umbrella concept’ for other established nature-based approaches such as ecosystem-based adaptation (EbA) and mitigation (EbM), eco-disaster risk reduction (eco-DRR), green infrastructure (GI), and natural climate solutions (NCS).”

Integrated landscape management

The management of production systems and natural resources in an area large enough to produce vital ecosystem services and small enough to be managed by the people using the land and producing those services (FAO 2019). Often involves long-term collaboration among different groups of land managers and stakeholders to achieve the multiple objectives required from the landscape. These typically include agricultural production, provision of ecosystem services, protection of biodiversity, landscape beauty, identity and recreation value, and local livelihoods, human health, and well-being. Stakeholders seek to solve shared problems or capitalize on new opportunities that reduce trade-offs and strengthen synergies among different landscape objectives (EcoAgricultural Partners 2013).

1.5 Contents of this report

Natural capital thinking is the next step in an evolving story. It builds on and links many of the existing approaches driving positive change in business, markets, and economies. The remainder of the report summarizes key insights from corporate natural capital experiences and how these can inspire further progress towards sustainability and resilience for businesses, markets and society.

Section 2 explores the three shifts where businesses are building on their existing base for environmental management with additional insights on the relationship between natural capital, business operations and the local landscape.

Section 3 explores the contextual factors needed to build durable shared solutions across partners—using the experience of businesses as examples.

Section 4 provides a summary of how the natural capital approach provides a pathway to resilience for business at a landscape level. It also discusses cases where the market in which the business operates can promote adoption of natural capital approaches by other market participants.

This is followed in section 5 by a discussion of frontier opportunities and observations on next steps that can help to continue this work on the pathway to resilience and sustainability.

2. Key shifts arising from natural capital applications

A growing number of businesses are evolving their understanding of natural capital as an integral part of their core business operations. To strengthen decision-making and enhance resilience, these businesses are shifting their thinking on the environment through three shifts that are strengthening decision-making and enhancing resilience in business:

- i.** from measurement to value for business and society;
- ii.** from impacts to assets and shared dependencies; and
- iii.** from direct site-level assessment of operations to a broader value chain and landscape approach.

Before expanding on the three shifts (figure 2), it is important to recognize that natural capital is above all a systems approach to thinking about the relationships of business, economies, and society to the natural world. Systems thinking involves understanding the dynamic interconnections between things over space and time. This includes considering both a value chain (or cradle-to-grave) perspective and a long-term perspective. Systems thinking features in all three shifts and is particularly pertinent to the third shift.

Business and society are increasingly capturing opportunities from innovation and increased connectivity.

- ▶ The SDGs as a joint development roadmap
- ▶ Win-Win Scenarios: business profitability and resilient livelihoods
- ▶ Global growth opportunities

Market participants must be ready to meet the challenges of the 21st century (e.g., climate, market volatility, social changes), to anticipate change, to adapt, and ultimately build resilient markets to manage demands on natural assets and withstand future shocks and stresses.

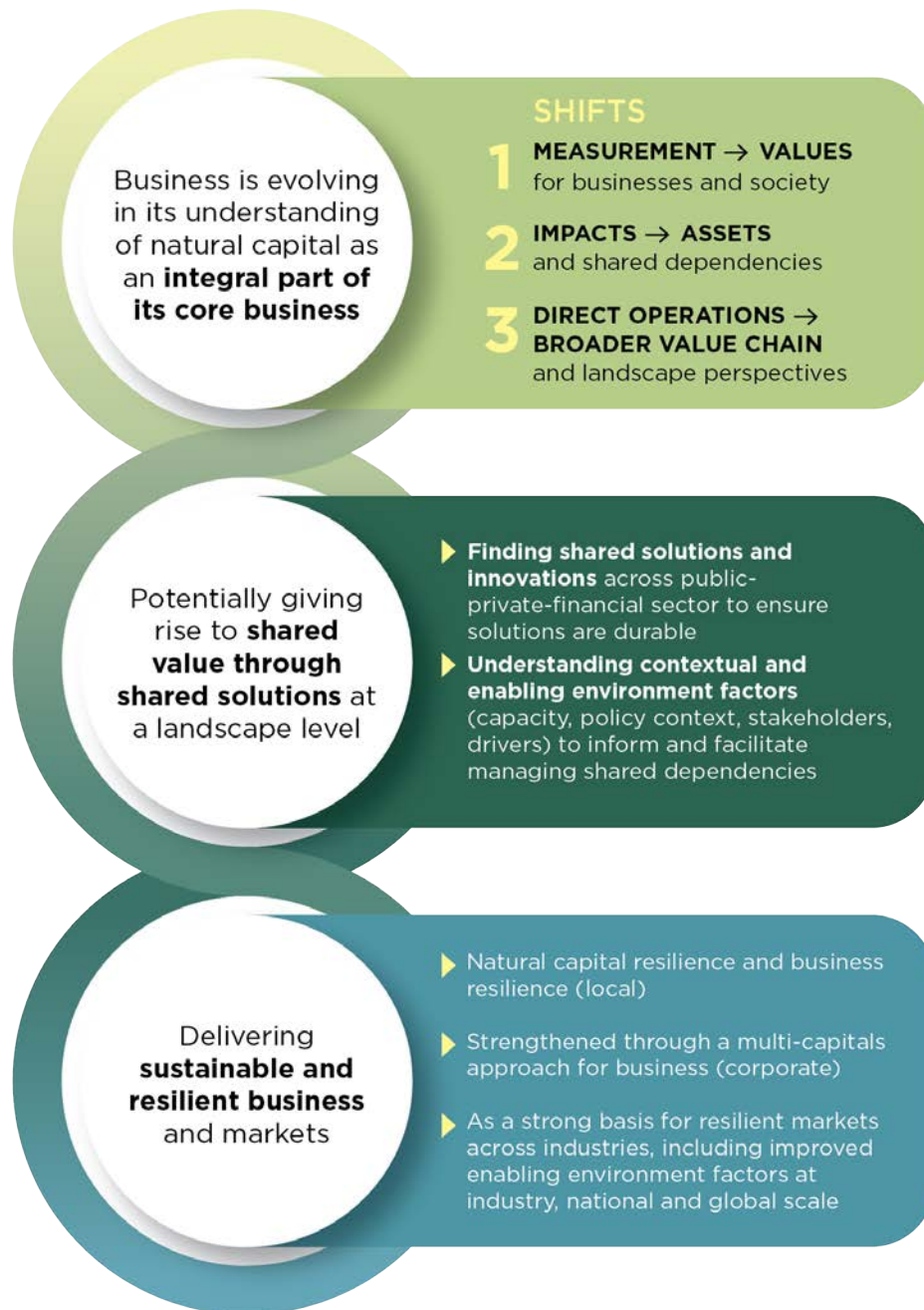


Figure 2. Natural capital shifts leading to resilient and sustainable markets

2.1 Shift one: From measurement to value for business and society

Shift one involves going beyond measuring quantities, concentrations, and flows to include the relative importance and worth (or value) that nature provides for people. For example, rather than just knowing a new technology could reduce a business's water consumption by 250,000 m³ per year, it may be helpful to know that this would provide annual cost savings to the business of US\$75,000 and annual benefits to local stakeholders, including local businesses, of US\$125,000. Although in this example we are talking about monetary value, businesses also use qualified and quantified values to inform decisions. For example, a risk prioritization process is a way of valuing what is important to a business and would also be consistent with a natural capital approach.

This shift enables businesses to translate measurement of quantities into a format that can inform business discussions and help influence strategy, policy, and stakeholder and local government engagement. A key advantage of value determination in addition to measurement is that when undertaken well, valuation takes the local context into account. For example, valuing water requires consideration of relevant location-specific supply and demand, typically using site-specific water availability data, and local cultural values. Valuation can also build in likely changes at a local level due to climate change—translating what might happen into terms that are understandable to those in the local context. There are caveats to this approach, including that any valuation should be based on sustainable long-term use.

Valuation therefore allows deeper comparisons and trade-off analysis between different environmental issues and solutions. It becomes possible to compare different environmental issues and even social and governance issues to determine their relative significance. This leads to being able to better inform scenario analysis and modeling. The values will typically be estimates and often indicative only, but they do provide a direction of travel and a common yardstick—and therefore more information to inform decisions than we previously had.

Examples: Shift one

In their first natural capital assessment in 2015-16, undertaken to pilot and inform the Natural Capital Protocol, **Roche** found that monetary valuation provided useful additional insights over their existing quantitative environmental impact assessment approach. Their previous “Eco-balance” approach took into account the national context and consequences of different impacts applying a quantitative scoring. Using a monetary valuation approach revealed a similar relative order of magnitude impacts (i.e., a similar percentage breakdown) for the main environmental impacts at all six of the company's Swiss operational sites. This effectively validated both the eco-balance and monetary valuation application approaches that the Natural Capital Protocol set out. The monetary valuation approach also allows the company and stakeholders to better understand and relate to how relevant Roche's negative impacts actually are. In this respect, the natural capital monetary valuation revealed that the total societal cost of their Swiss environmental impacts equates to around six percent of the annual net income for the associated Swiss operations.

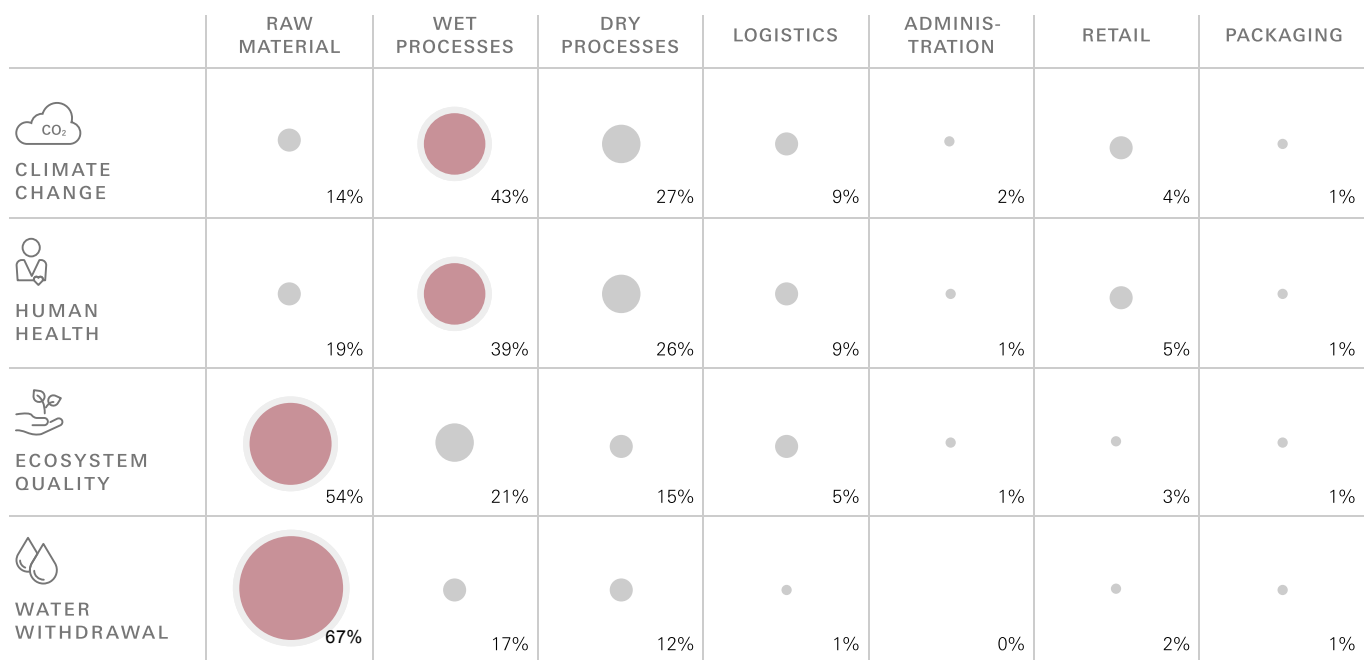
Having seen the benefit of better understanding the value of their environmental impacts and dependencies, Roche then undertook two more natural capital assessments. One focused on the monetary valuation of both the business costs and benefits of their water dependency and impacts, as well as the societal costs and benefits of their water impacts at one of their operations in California, a water-stressed area. The other valued their material environmental (and social) impacts across their global operations in monetary terms to produce an Environmental and Social Profit and Loss Account.

While **HUGO BOSS** had been measuring their environmental impacts for some years, they found that direct comparison of the significance of impacts, and the resulting ranking, was problematic due to the different units used (e.g., kg of CO₂ emissions or m² of land use). They applied the Natural Capital Protocol to guide the translation of unit-based environmental

impacts into monetary values of their estimated societal impact to make them comparable. In this way, factors with the greatest societal impact in the value chain were identified and could be targeted with suitable strategies, offering greater depth of decision-making than simply minimizing negative impacts. The results of the natural capital assessment are shown in figure 3, clearly highlighting which part of the value chain causes the most impact across four environmental categories, and identifying hotspots for focusing efforts.

BASF, Kering, Natura, Novartis and **Philips** are amongst a growing number of other businesses that have applied a natural capital approach to understand the monetary value of their environmental impacts in different parts of their value chain and geographies.

Their assessments have provided a powerful contextual perspective that allows easy comparison for important corporate decisions. Communication of the magnitude of potential risks is facilitated with simple graphics (e.g., similar to figure 3) helping to influence each business to prioritize and target action where most needed to manage negative societal impacts. This approach encourages collaboration between stakeholders in different tiers of the value chain, as most of the more significant impacts are found upstream in the extractive, raw material, and manufacturing processes. In addition, Natura believed that quantifying their impacts in monetary terms made it easier to justify greater innovation in the use of materials and production processes.



State May 2018: Based on data collected in 2016 (please see 2nd edition of the White Paper) and data updates in 2018.

 Hotspot

Figure 3. Valuation of impacts in HUGO BOSS's overall value chain.
 Source: HUGO BOSS 2020

Espadan, a Spanish cork producer small and medium enterprise (SME), applied monetary valuation to the environmental benefits of their natural capital impacts to help inform a communications strategy and improve their competitiveness in the market.

The **Glenlivet Estate** in Scotland found that monetary valuation of their land-management-based impacts was useful to enhance the understanding of their tenants around natural capital assets and ecosystem services, and to potentially provide useful evidence for funding applications.

Nespresso, in their assessment in Colombia, used the Protocol to help quantify and value the benefits of their sustainability programs in monetary terms—in particular in relation to water savings and other natural capital benefits. They found that on average around 16,000 m³ of water could be saved each year in total on the 10,585 AAA accredited farms, and that US\$1 invested could provide up to a US\$10 return in extreme water-scarcity scenarios (a year-long drought) or US\$2.2 for a three-month drought. This additional monetary-value-based perspective helped Nespresso better understand the extent to which their initiatives may be adding value and the importance of investing in them for both their business and society. The findings for times of extreme water scarcity can also help to justify and improve localized resilience strategies needed to adapt to changing climatic conditions.

In its natural capital assessment in Rwanda, **The Wood Foundation Africa** (TWFA) benefited from applying a monetary valuation approach to ascertain the extent to which they and different stakeholder groups would benefit from a change in farming regime that factored in potential climate change shocks and natural capital impacts. TWFA established the monetary value of incremental annual incomes that farmers would gain from converting corn to contoured tea plantations at US\$1,260/ha/yr, a significant five-fold increase when compared to the baseline net revenues of about US\$260/ha/yr. The approach also estimated associated savings to downstream farmers from the reduced sedimentation from contouring (US\$425 to US\$510/ha/yr, in situations without and with climate change respectively) and savings to a downstream

water treatment plant from reduced treatment costs (US\$2,016 per year). Reduced sedimentation was estimated using the “change in productivity” technique, assuming a linear relationship between soil loss and crop yield while reduced treatment costs were based on an “avoided costs” approach.

For TWFA, this information can be used to help persuade more producers to invest in improved tea management and convince other smallholders to switch to growing tea. For an impact investor, this information is powerful both to maximise positive results and scale successful models. It is also critical to understand the wider social consequences if other investors convert additional hectares of local food crops to tea crops for export. In such a case, contoured tea plantations need less land to produce the same amount of tea crop compared to non-contoured tea plantations. In addition, by determining estimated monetary savings for downstream stakeholders, the approach also demonstrated the Protocol’s potential role in informing payment for ecosystem services schemes in similar contexts.

In their assessment in Indonesia, **Olam** found a valuation approach, as set out in the Protocol, provided a powerful way to evaluate the outcomes of a range of alternative coffee farming management practices to inform which option is best and by how much under highly variable conditions. This is particularly relevant in the face of such a challenging environmental context, as it provides tangible outputs to inform discussion of options with local farmers and helps demonstrate to farmers how long-term benefits of coffee farming can be enhanced and resilience maintained. For example, the analysis showed that coffee farmers converting to use of a mixed organic-inorganic fertilizer can increase their annual cash flows by up to 70 percent when climatic variability and volcanic shocks are taken into account. The assessment also determined that farmers’ incomes could rise by between 5 to 25 percent if they used more water-efficient processes and increased their storage of rainwater.

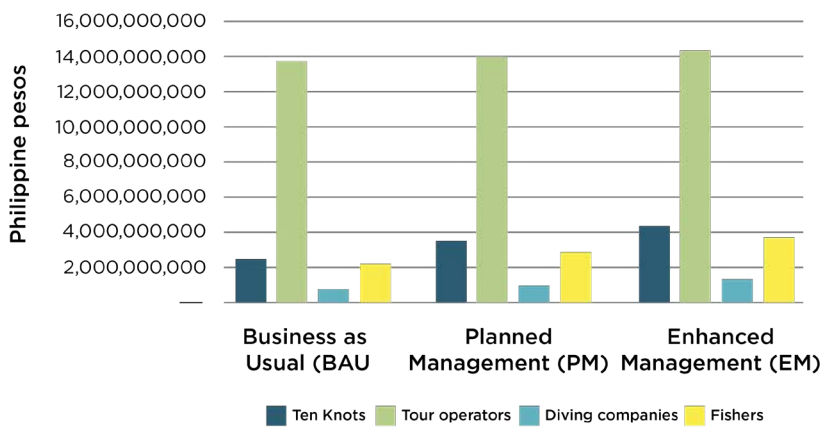
The analysis also confirmed the significant benefits of buying water at critical times during the growth cycle when no other source of water is available.

In the **Ten Knots Group** assessment in the Philippines, the Protocol application used monetary valuation to evaluate and compare the outcomes and trade-offs between three alternative management options for Bacuit Bay. The monetary valuation assessment helped inform and communicate what management actions are needed in the bay to optimize tourism development and fishery management for the long-term sustainable future of the bay and the value its stakeholders derive. While the assessment showed that the “planned management” option is better than existing “business as usual (BAU), the assessment also introduced an alternative “Enhanced Management” option which was shown to be preferable to all. By estimating the monetary value of net benefits (i.e., profits less costs) for each stakeholder group (island resorts, dive operators, boat tour operators, and fishers), and in total, it is clear to see which option is best overall and how the stakeholder groups fare

(see figure 4). While the boat tour operators are seen to gain the least additional benefits in the graph on the left, the graph on the right shows a far better long-term outcome for them than the likely short-term boom and bust under the BAU option. The local government of Palawan and the national government of the Philippines were also shown to benefit significantly under the Enhanced Management option in terms of potential additional protected area visitor fees and tourism-related tax revenues that could then be used to further protect Bacuit Bay.

Although Ten Knots has operated in Bacuit Bay the longest, and worked the most with the local government and local stakeholders, they have no control over which management scenario is actually selected. It is also worth noting that the projected impacts for each scenario are based on the cumulative impacts of the various stakeholder groups, of which Ten Knots is just one.

NET PRESENT VALUE COMPARISON BETWEEN STAKEHOLDERS



BOAT TOUR NET REVENUES

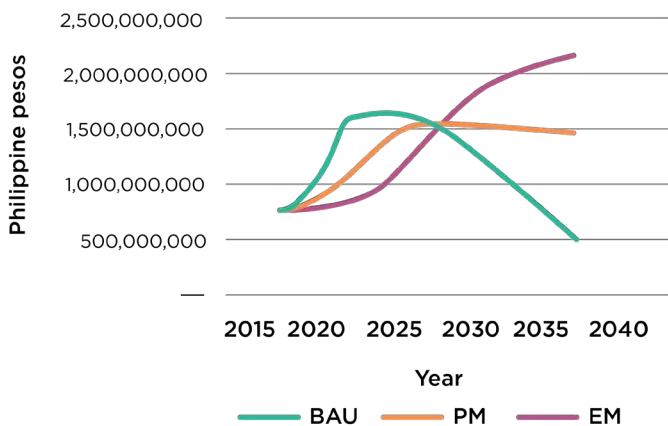


Figure 4. Breakdown of values to Bacuit Bay stakeholder groups, with three management options. Source: Ten Knots Assessment as part of IFC’s Natural Capital Advisory Services Program (2018). Indufor and Sustain Value

2.2 Shift two: From impacts to assets and shared dependencies

In this shift, natural capital thinking encourages businesses to see the environment as an asset they depend upon that is critical to their long-term viability, rather than just something they impact which needs to be managed. These dependencies are typically shared with other stakeholders such as local communities and other businesses.

Businesses are increasingly seeing the business case for looking at nature as an asset—an asset whose continued availability they depend upon. Indeed, the term natural “capital” is purposefully used to express the concept of the environment being an asset that gives rise to a flow of benefits, in an analogous way to financial capital in a savings account giving rise to a continuous flow of interest. When natural capital flows are interrupted, businesses may cease to be able to function or will face considerable disruption and cost while finding alternative ways of delivering or maintaining an equivalent service.

Under business as usual in the past, such dependencies have rarely been a significant concern for companies. Use of surface or groundwater has typically been free, or alternative suppliers of coffee, cocoa, or sugar could be readily found.

However, business as usual is no longer the case. Dwindling resources combined with growing populations and consumerism, and increasingly apparent climate change impacts, mean that businesses face a more competitive, turbulent, and challenging environment in which to operate. Dependencies on nature are thus highly relevant to business strategy. Knowing its material dependencies and potential vulnerabilities to shocks and stresses can help a business develop resilience strategies for maintaining key natural capital supplies and dependencies.

Examples: Shift two

A common natural capital dependency that business assessments have focused on is water. **Dow, International Paper, Olam, Roche,** and **Shell** have all conducted natural capital assessments that investigate the value of their operational dependency on water. A core feature of these assessments is determining the cost to their business of variable water availability scenarios.

This has been valued through evaluating the loss of production from reduced supply, and the cost of obtaining an alternative supply. What these studies have come to recognize is that the water businesses depend upon is also used elsewhere in the catchment by other stakeholders. Water is very much a shared dependency often requiring shared solutions. These businesses have found that a better understanding of the value of water to the business and other stakeholders can help inform their strategy and justify appropriate water efficiency and conservation measures.

The finance community is beginning to explore business dependencies on natural capital and associated risks and opportunities in relation to their investments, as the following examples show. **BNP Paribas Asset Management** (BNPP AM) is working to map natural capital impact drivers and dependencies to better manage associated risks and opportunities in its investment portfolio. The firm wants to extend its existing work on climate change, with an initial focus on water.

As part of this, they investigated 42 European companies across 6 sectors, and 7 European mining companies in more detail. Using a set of water-related key performance indicators such as exposure to water stress, water consumption, and water management, the firm assessed the different companies' impact and dependency risks qualitatively and then gave them a score. BNPP AM is now sharing the outcomes with its institutional investor clients and civil society, as well as assessing other natural capital impacts and dependencies for companies in other sectors.

ACTIAM is also beginning to investigate natural capital impacts and dependencies of companies it invests in, as they believe associated risks and opportunities will affect the financial performance of those companies both now and in the future. In addition to setting a greenhouse gas emissions portfolio reduction goal of 40 percent by 2040 (compared to 2010), they have now set a water neutral portfolio target by 2030 and a zero deforestation portfolio target by 2030. These latter two targets will increasingly affect the nature and extent of investments in companies dependent on water and forests.

The **Natural Capital Finance Alliance** has focused efforts on helping the finance sector better understand and manage risks associated with natural capital dependencies. They have created three tools that specifically look at the financial risks associated with business dependencies on water (the Drought Stress Testing Tool, the Bloomberg Water Risk Valuation Tool, and the Corporate Bonds Water Credit Risk Tool), as well as a more generic natural capital dependency tool, ENCORE (Natural Capital Finance Alliance 2020), which includes some good examples and has been updated recently to look at impacts as well as dependencies.

The four corporate applications all had a strong emphasis on natural capital dependencies that the companies ultimately rely upon for continued business success. In each, the potential impact and consequences of climate change and other shocks upon these dependencies were considered over time. What became apparent is that the natural capital dependencies of each business are very much shared dependencies with other stakeholders in a wider landscape, both other businesses and local communities.

The Wood Foundation Africa assessment in Rwanda revealed how tea farmers, downstream farmers, and a water treatment plant are all dependent on the natural capital in the upper catchment, in particular the vegetation cover and soil structure of the land, which affects soil erosion and downstream sedimentation. Modifying upstream land-use management practices can significantly enhance downstream farmer incomes and save costs for the water treatment plant. Furthermore, TWFA's study also confirmed the significance of the tea plantations' operational dependency on fuelwood, currently sourced from their own eucalyptus plantation. By better managing this dependency through improving techniques to increase productivity of the eucalyptus, both for their own expanding requirements and also to sell excess wood to others, a long-term benefit of over US\$900 thousand could be generated. This shows how more proactive thinking about corporate natural capital dependencies can generate considerable additional opportunities.

The **Nespresso** application in Colombia began by identifying a range of natural capital dependencies of their coffee farmers including land, healthy and stable soil, pollination, forest cover for shade, pest control, and water. For reasons of data availability, their assessment focused on their farmers' water dependency and valuing the benefits to be gained from better managing that dependency. With predicted climate change impacts on water availability, they established a financial case for improving water efficiencies in the more water-stressed areas. They also highlighted that a community-based central milling operation could be more than twice as water efficient than on-farm milling. As is further explored later, this harnesses the shared dependency concept to leverage more cost-effective shared solutions. The Protocol application enabled Nespresso to quantify the value of their water dependency in terms of physical water savings for farmers and potential societal value generated based on money invested by Nespresso into sustainability initiatives on the farms.

In their Indonesia application, **Olam** used the Protocol to explore how farmers in their supply chain depend upon natural capital, as their existing Rainforest Alliance certification scheme does not cover that. They focused on the water dependency and evaluated the benefits of reducing the water required for washing coffee and providing additional infrastructure to store rainwater. Based on the cost of purchasing water in times of drought of around US\$4/m³, the assessment showed that changing the wash process could increase annual incomes by around 5 percent a year, and harvesting rainwater could increase incomes by 26 percent per year. The farmers' reduced water consumption may also benefit other stakeholders in the catchment who have a shared dependency on water, by reducing the overall demand for water in the catchment.

Smaller businesses are also recognizing that a dependency-based approach can be a more compelling means of gaining internal buy-in to determine how to deal with environmental issues. In the tourism sector, many of the smaller operators have limited capacity for addressing environmental risks at the scale of a Nespresso or Shell.

They also have a shared dependency with many other small competitors on the continued availability of assets in good quality condition to continue to attract tourists. Understanding and communicating this shared asset that none of them own can start a conversation about how to drive action to conserve it.

In the Philippines, **Ten Knots Group** and the Palawan Council for Sustainable Development investigated this issue by evaluating the impacts and dependencies of island resorts, boat tour operators, and fishermen on the marine resources in Bacuit Bay.

The assessment revealed that these stakeholder groups are highly dependent on the quality and

quantity of coral reefs, water quality, and fish populations within the bay for their continued viability and existence. The assessment thus clearly demonstrated each had a shared dependency with the other stakeholders on the same natural capital, and that it was in all their interests to help maintain and enhance this natural capital asset base through an “Enhanced Management” scenario. The need for strengthened and coordinated action was made all the more apparent as a result of predicted climate change shocks such as coral bleaching, storm damage, and sediment runoff. The management approach ultimately implemented is in the hands of the local municipality and national government.

2.3 Shift three: From direct site level to a broader value chain and landscape approach

In this shift, natural capital thinking highlights and harnesses the interconnectivity between natural capital assets, stakeholders, and initiatives within a wider geographic area than just a business’s direct site-level operations. This landscape perspective enables businesses to find solutions to address their natural capital dependencies and impacts that are beyond their ability to enact alone.

This shift draws on the growing understanding that a supply-chain and landscape-level approach is the best way to optimize the sustainable use and development of resources within an appropriate spatial scale over a period of time based on multiple stakeholder interests and requirements.

By recognizing that everything is connected, this shift helps provide a richer understanding of both dependency and value. Cumulative impacts from multiple actors are also taken into account, enabling businesses to go across boundaries of immediate operations and footprint. While people are often put off by the complexity of landscape-based or systems thinking, system-level understanding is critical to truly manage volatility, build stronger relationships based on shared dependencies, and create longer-term shared solutions (see section 3).

Taking a systems approach to natural capital is increasingly recognized as essential to the sustainable use of resources. This is driven by the interconnectivity of habitats and ecosystem services within the same landscapes, watersheds, and seascapes, and the fact that so many natural capital assets, and the ecosystem services they generate, are shared by multiple stakeholders.

Longer-term thinking is essential when dealing with natural capital and business resilience at a landscape level. Many of the critical challenges around natural capital may only manifest over time. For example, overcrowding from tourism and climate change implications may mean that a natural capital dependency, while not an issue now, may become one over time. Longer term thinking requires an awareness of all the returns that come from an investment, including benefits to people and nature and not just the immediate financial return.

Achieving longer-term thinking requires the firm to look beyond the near term, to the longer-term strategic dependency on the resource and potentially to invest in solutions today with a long payback period. For example, natural-capital-based solutions, such as habitat restoration to generate ecosystem services, typically have long-term payback periods with high upfront costs, modest short-term benefits, and much greater long-term benefits accruing.

Thinking in the longer-term is consistent with what is understood as a systems approach to thinking about relationships in the natural world and helps to explain the dynamic interconnections between things over space and time. Longer-term thinking includes cradle- to-cradle or value chain perspectives, and even going beyond natural capital to other important trade-offs such as social and economic factors.

Examples: Shift three

Each of the Protocol applications conducted by **Dow**, **International Paper**, **Roche**, and **Shell** took a landscape approach that explored ways of reducing their own water consumption, and in some cases the levels of pollutants discharged. In addition, they also highlighted the importance of understanding the water impact and dependency of other stakeholders in the same watershed. This knowledge provided the companies with valuable insights on the relative importance of water use within their catchments to inform improved water-stewardship and decision-making and helped to make a more compelling case internally for water efficiency. As explained in the next section, such knowledge can be used to explore joint solutions for shared problems.

Mondi has used the Protocol to streamline and inform ongoing natural capital projects they have at a regional level. This included conducting an assessment on the Mezan River catchment in Russia where they operate a forest plantation. Mondi adopted a broad catchment-level approach to consult with stakeholders across the landscape to define the most important long-term impacts to fish resources and freshwater ecosystems upon which local communities depend. The aim has been to identify preferred mitigation measures and useful fish monitoring indicators, because communities perceive the decline in fish to be linked to past logging activities.

Taking a landscape-level approach to valuing the **Karingani Game Reserve** in Mozambique was also critical for informing a natural capital asset valuation for a divestment deal based. The valuation was undertaken on behalf of three conservation investors, led by the Paul Tudor Jones Family Office, to inform the purchase of an equity stake in the game reserve by a US foundation. Taking a landscape approach effectively helped add a 20 percent uplift in the base

sale price due to ecosystem synergies with the Greater Limpopo Trans-Frontier conservation area.

In **The Wood Foundation Africa's** application in Rwanda, a landscape-level approach was critical in demonstrating, and taking into account, the interconnectedness of natural capital impacts and dependencies within the catchment. The assessment considered and valued how improved crop management within an upper catchment can have positive economic knock-on effects for farming and water treatment downstream. Taking a landscape-level approach thus helps to consider indirect impacts and regulating ecosystem services which are often ignored by conventional market-based approaches. This thinking can help reveal new natural-capital-related opportunities such as payment for ecosystem services solutions. Landscape thinking was also instrumental in how and why TWFA has gone on to promote this natural capital approach to other tea growers in the catchment and elsewhere in Rwanda. By sharing their learnings with others, the entire catchment can benefit from improved soil management practice and enhanced climate change resilience: representing mutual benefits for all stakeholder groups.

Nespresso's Colombia application explored a number of its farmers' water use in two large regions, Cauca and Narino. However, the assessment considered smallholder coffee farms on an individual basis, and it became clear that future assessments should adopt a more integrated landscape approach. Adopting a catchment-based approach to water uses and values could, for example, have led to building a stronger value-based case for changing to a communal milling process and to perhaps adopting some low-cost infrastructure solutions such as water storage and irrigation.

This would have shown far greater overall water savings for the farmers and wider catchment users, and probably significant overall cost savings to farmers. The intense data requirements and relatively low savings per farm highlighted the need for collaboration at a landscape level. By including the local government and other area stakeholders and sharing the cost of undertaking natural capital assessments, the cost decreases and the benefits are shared.

Olam's Indonesia application similarly focused on assessing individual smallholder coffee farms, in this case, suppliers to two coffee-buying stations in the Wampu watershed, in Karo Regency in Sumatra. The assessment itself did not draw upon a landscape approach for its valuation, but highlighted that by taking a broader catchment perspective, key stakeholders could identify common strategies for dealing with problems around shared dependencies such as water, where improved infrastructure is needed. As addressed later, taking a landscape approach can reveal joint water-management solutions and demonstrate how biodiversity benefits from farm activities, such as implementing agroforestry, can benefit other stakeholders elsewhere in a catchment.

The **Ten Knots Group** and tour and dive operators in El Nido, Palawan, Philippines took a landscape approach that included both a watershed and coastal

bay as shown in figure 5. By taking this joint land- and seascape approach, the full range of relevant impacts and dependencies to each stakeholder group (island resorts, tour and dive operators, fishermen, wider economy, and government) could be accounted for when comparing the three management options. This broad assessment captured a range of impacts occurring as a result of tourist arrivals, dive and boat tour activities, sedimentation runoff, sewage runoff, fishing, and climate change impacts such as coral bleaching and storm damage. The assessment, undertaken for a 20-year period, demonstrated that while the “planned management” option would generate US\$29 million of stakeholder benefits compared to a “business-as-usual option”, an “enhanced management” option could generate an additional US\$50 million compared to the “planned management” option.

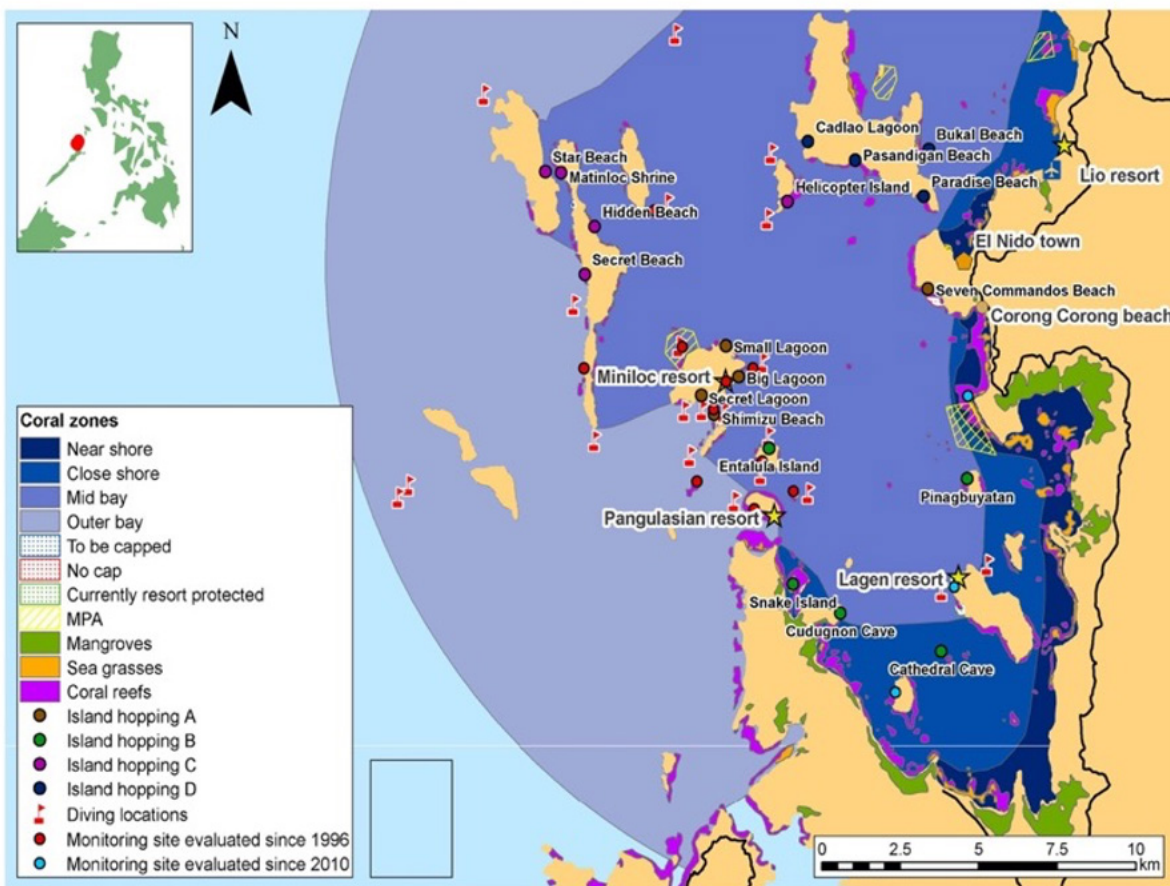


Figure 5. Land and seascape zonation map used in the Philippines assessment. *Ten Knots Assessment as part of IFC's Natural Capital Advisory Services Program (2018). Indufor and Sustain Value*

A number of businesses that have applied the Protocol also found that following a standardized natural capital approach opened their eyes to a variety of other environmental issues they had not previously considered. For example, it became apparent to Skanska when applying the Protocol that they did not have biodiversity impact metrics in their existing approach. Roche recognized that they could include the positive impacts they have in relation to biodiversity, green space, and local food production within their future site environmental assessments to give a more balanced overall evaluation of their impacts by capturing shared benefits. ASN Bank took a broader approach to how they manage their portfolio of investment funds. They extended their initial focus on climate change impacts to cover biodiversity (as well as human rights). This more holistic approach is due to the interconnections they see between these issues.

As more companies undertake natural capital assessments and develop shared solutions that build on the three shifts, greater dissemination, sharing and application of natural capital approaches with sector peers (e.g., tea, tourism, coffee, apparel) can build market-based resiliency. When a natural capital approach is combined with other capitals (e.g., human, social, and produced), the outcome can lead to greater resilience across other industries, reinforcing localized landscape-based solutions. This in turn is likely to encourage and incentivize further uptake of natural and integrated capitals thinking, leading to broader mutually beneficial solutions. In effect, it becomes a virtuous circle of activity and improvements. In short, these three shifts can result in more sustainable and resilient businesses that generate long-term shared value for society as a whole.

3. Shared solutions at a landscape level

This section builds upon the three shifts explored in section two and focuses on how understanding contextual factors can uncover shared solutions across partners—using the experience of businesses as examples.

It helps to set out a framework for broader use and uptake of natural capital assessments. The framework is expressed using a diagnostic tool to help companies better understand the wider context of their natural capital efforts and thus help identify shared solutions.

Ultimately this approach could help shift the market to incorporate natural capital approaches in a self-reinforcing manner. The more natural capital approaches are seen and recognized to support sustainable and resilient businesses, the more conducive the enabling environment will become. It is vital that wider social impacts are considered too, especially in relation to any unintended consequences.

When companies start to embrace the three shifts it quickly becomes apparent that this is not “business as usual.” Not only can businesses gain through better strategic, risk, and opportunity management—resulting in cost savings, increased revenues, and enhanced innovation and reputation—but they can also design longer-term sustainable and resilient business models. This resiliency can ultimately help businesses face inevitable shocks and stresses to the natural resources on which they depend, including shocks related to climate change. Often the value and longevity of a natural resource dependency can only be created through acting jointly with others in a landscape. At times, these solutions, such as to ensure a sustainable supply of clean water or protection of coral reefs, are beyond an individual business’s responsibility and capacity to singularly address. In these instances, fully understanding the wider context is critical to identify the highest priority actions, relevant stakeholders, optimum solutions, and broadest array of financing sources—all of which are needed to build shared solutions. Together, the market as a whole can benefit, resulting in broader market uptake of enhanced natural capital management practices, ultimately shifting the market to a more resilient state.

3.1 Understand the broader context

As noted, integrated landscape management approaches have been gaining prominence on business and financial agendas over the past few years. Several key business publications have promoted the need for such an approach and for businesses to become actively engaged in the topic (e.g., Kissinger

et al. 2013, World Bank 2014, Global Canopy et al. 2015, WBCSD 2016). These documents set out the business case for companies to adopt an integrated landscape management approach and provide examples of application and recommendations for action.

Some of the current market leaders' experience and views reinforce this thinking.

According to José Lopez, when he was Executive Vice President of Operations at Nestlé: "At Nestlé we believe that for a company to be successful over time and create value for its shareholders, it must also create value for society. Landscape-level thinking is crucial to creating shared value. For example, in our work on rural development, building in resilience at a community level or ensuring that local people have access to public natural resources such as clean air, water, or unpolluted common land means that we need to go beyond the actions of individual farmers and operate at the landscape level" (in Kissinger et al. 2013).

Olam has reaffirmed this through their 2018 Living Landscapes Policy stating: "Agriculture faces the immense challenge of producing enough food and fibre for 9.5 billion people by 2050, whilst alleviating poverty, providing employment and decent livelihood opportunities in rural areas, and conserving natural habitats and biodiversity. A response based mainly on doing less harm, focusing efforts to eliminate unacceptable practices such as deforestation at the scale of individual farms or plantations, or on incremental improvements by companies representing a small fraction of the supply chain, will not be sufficient to meet these challenges. Instead, we need to reimagine global agriculture, shifting away from destructive resource extraction, and towards a net positive impact at scale, based on the creation and restoration of natural and social capital within living landscapes" (Olam 2018).

Landscape-level thinking and resolution of issues require landscape-level solutions. This type of approach is more complicated for many companies to deal with than business as usual. Solutions go beyond the immediate footprint of the firm and have implications for a broader set of stakeholders. Often it is not evident what responsibility or influence the business has to make a landscape-level approach successful.

Doing so requires an understanding of the different goals, dependencies, and values that other stakeholders have within the same landscape in which a business, or its suppliers, operates. The stakeholders may even be competitors in the marketplace. Companies may need to switch from a competitor mode of thinking to that of "co-opetition" (Della Corte and Aria 2016) whereby competitors work together for mutual advantage. Dealing with shared dependencies together is likely to be less expensive and solutions are more likely to be found. This requires companies to start thinking about how they address challenges together because the sustainable management of natural capital is dependent on every actor in a landscape or watershed cooperating to manage common dependencies.

A first step is a clear country-level assessment using the diagnostic tool of the related policy environment, capacity, stakeholders, and sector-specific issues. This insight is valuable in a number of ways. A business can better understand its potential leverage points including: collaboration with partners, competitors, or throughout its value chain; opportunities for innovative approaches or programs; priority areas for accelerated support; and resources that might be available to support action. It can also help inform policy actions to support enhanced management of natural capital assets across stakeholders and companies.

Experience in application of the Natural Capital Protocol at a landscape level reinforced the utility of understanding the four central elements—the policy environment, business and institutional capacity, stakeholders and networks, and sector-specific issues—and using them to convene stakeholders around key themes and practical actions. The greater the number of material natural capital dependencies, and the more connected these are with related dependencies of other businesses and stakeholders, the greater the need for a deep contextual analysis. In such situations it becomes even more critical to understand the political economy and dynamics of the enabling environment in order to determine appropriate actions and approaches.

3.2 Diagnostic approach

The diagnostic approach described here can be used by businesses and others to understand the factors that might limit (or catalyze) shared solutions around managing natural capital. The insight gained from this exercise can help identify potential leverage points across a range of actors to maintain a sustainable and resilient natural capital base, driving market change and enabling a long-term natural capital approach.

Experience from the four corporate applications demonstrated that understanding local context, such as through a diagnostic tool, in conjunction with a natural capital assessment, can provide multiple benefits including:

- Informing and strengthening the natural capital assessment
- Highlighting broader potential landscape win-win-win (public-private-financial sector) solutions; and
- Revealing broader actions to boost the uptake of natural capital thinking within the landscape, sector, and/or country

A diagnostic tool was developed and applied in the four countries to identify areas of strength to capitalize on, and areas of weakness to improve (see figure 6). The approach covers four main areas: policy environment, stakeholders and networks, business and organizational capacity, and industry drivers.

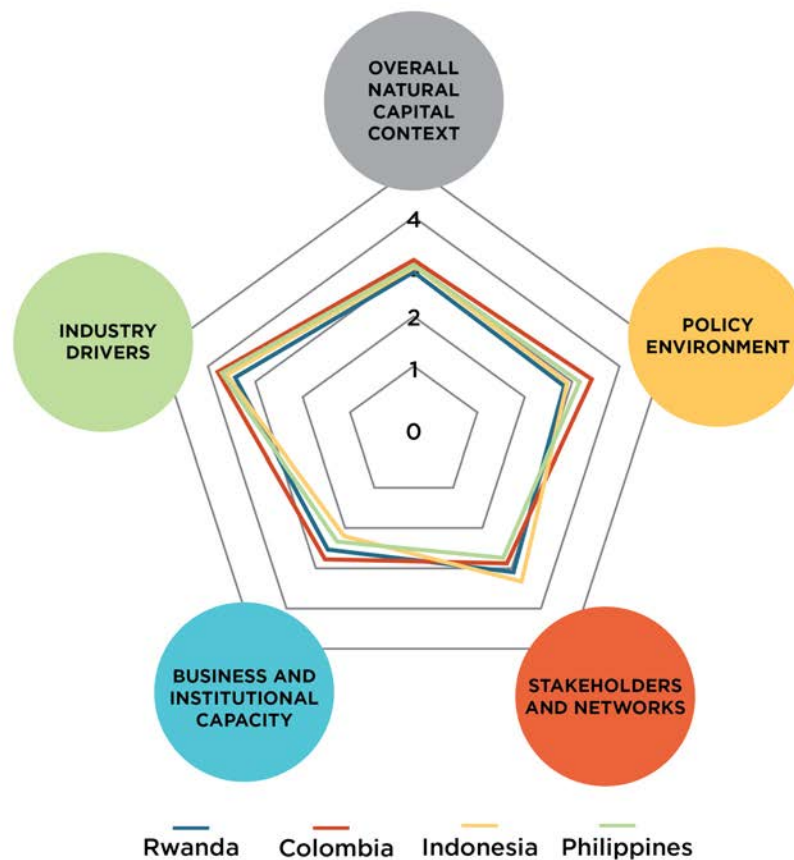


Figure 6. Natural capital elements of the diagnostic tool.

3.2.1 Policy environment

While not strictly necessary to engender action, a strong and supportive policy environment provides the kind of critical signal that business looks for to trigger actions and measures that can support businesses to take first steps towards action. This is particularly true where use of a resource is shared by numerous stakeholders. In such cases, regulation is likely to be a prerequisite for a level playing field and required to scale up business action. A level playing field, or the prospect of an eventual level playing field, may provide the ultimate incentive to help shift general concern and perhaps even good intention about natural capital management into operational reality.

This is particularly evident where environmental issues and economic growth overlap, as there are decades of experience suggesting that market failure and inefficient policies have contributed to economic growth that causes environmental degradation and depletion of natural capital. The results of unsustainable action by business and consumers is manifested at a landscape level and felt across many actors. In response, over the past 30 years three key areas of environmental economics have been proposed which advocate: i) environmental valuation, ii) creating the right incentives, and iii) environmental accounting (see box 5). Creating the right policy environment to achieve these changes requires progress in a number of areas. The following four categories are evaluated as part of the diagnostic, with an indication of the type of questions included for each category:

- **Laws, regulations, and political economy:** Are the right laws, regulations, and incentives (e.g., payments for ecosystem services) in place that align and support natural capital thinking uptake by the private sector? Is this enforced—including with involvement of public sector groups?
- **Policies, strategies, and champions:** Do important plans and strategies at the national and subnational level support natural capital approaches and management (e.g., valuation and trade-offs)? Is there an empowered champion in government and is there a national-level natural capital initiative (e.g., WAVES/UN SEEA) being implemented by government?
- **Data and information coverage:** Is there ease of access to data and information on natural capital for business and the financial sector (e.g., business management information systems, supply-chain data, traceability, government accounts)?
- **Reporting and disclosure:** Is there a culture of transparency and disclosure on natural capital impacts and dependencies in the sector, including drivers such as financial institutions requesting data from corporations?

The policy environment includes national and subnational activities; often local authorities can be important actors in designing new decision-making models.

BOX 5 • INFORMING ENVIRONMENTAL POLICIES THROUGH ENVIRONMENTAL ECONOMIC APPROACHES

According to the World Bank (2012), economic growth has caused environmental degradation for much of the past 250 years due to market failures and inefficient policies. Existing market incentives drive businesses and consumers to act unsustainably and intensify badly managed resource use at a landscape level. To counter this, the World Bank supports a “green growth” approach which involves growth policies that address market failures and “get the price right” by pricing environmental externalities (e.g., through carbon and air pollution pricing), introducing environmental taxes, creating tradable property rights, and reducing inappropriate subsidies. The World Bank suggests these measures are critical for enabling the private sector to undertake needed investments and innovations and for getting consumers and businesses to internalize the true costs of their behavior.

BOX 5 • INFORMING ENVIRONMENTAL POLICIES THROUGH ENVIRONMENTAL ECONOMIC APPROACHES (continued)

These are the type of policies and actions needed at a landscape level to help drive sustainable consumption and production. They are very much aligned with natural capital thinking. In Pearce, Markandya, and Barbier's (1989) *Blueprint for a Green Economy* report to the UK Government, they argued that the natural environment should be viewed as a form of capital asset, or natural capital. The 1989 report recommended urgent progress on three key policy areas based around environmental-economic thinking: valuing the environment, creating incentives for environmental improvement, and accounting for the environment.

In their 2013 follow-up book, *A New Blueprint for a Green Economy* (Barbier and Markandya 2013), the authors argue that with climate change and the continued decline in major ecosystems and associated ecosystem services, those three policy area goals are even more vital than before. However, as with all good economic policy textbook recommendations, they must be applied with insights into behaviors, political economy, governance, and market failures. This is an enormous challenge for a variety of reasons. For example, getting prices right may be difficult because of political or social acceptability issues, or because of other market imperfections (e.g., missing institutions, lack of predictability of price signals, or lack of knowledge and capacity). There could simply be inertia and biases in behavior, or financing may not be forthcoming because upfront investments are too challenging to secure. Implementing environmental taxes or charges, for example, must address potential unintended consequences—as evidenced by the gilet jaune strikes in France initiated by the rural poor opposed to proposed carbon fuel taxes.

While there is an encouraging policy shift towards natural capital accounting by some governments, with the EU and the World Bank WAVES initiative actively supporting it, there is still a long way to go. Natural capital accounting for businesses is also still only undertaken voluntarily, and by a small minority of companies. Correcting market failures through reforming incentive structures to better reflect environmental values is also still woefully inadequate.

In countries where regulations and institutions are weak, first mover companies often step in with voluntary approaches that are higher performing than average market practice and legal requirements. These may influence other companies in the market to set voluntary standards for the sector. Many of these first mover companies advocate for the government to take a more proactive role in setting policies and enforcement mechanisms. Ten Knots Group in El Nido, Palawan, in the Philippines, has recognized the need to strengthen environmental management within Bacuit Bay to ensure that the natural capital the company and other tourism businesses depend upon is better protected for long-term economic and societal benefit. The company has been instrumental in supporting the local government in implementing a range of environmental management policies, including the implementation of designated management areas within the subject landscape.

In addition, the public sector plays an important role in providing information and support that companies can use to underpin a natural capital approach, especially in their supply chain. Data is critical to implementing

all natural capital approaches, and considerable efficiencies and cost-savings could be found through more streamlined and coordinated data collection and provision between the public and private sectors (see Spurgeon et al. 2018 and Natural Capital Coalition 2019). This is especially the case in relation to emerging sources such as remote sensing data, big data, and use of artificial intelligence and machine learning.

As an example, in Rwanda, land and ecosystem services accounts developed by the government were important building blocks for The Wood Foundation Africa in undertaking a landscape-based approach. At the same time, the diagnostic helped to show that some available data were not at the needed level of detail for the company to use in its natural capital valuation, so the team had to develop a complementary approach focusing on more granular data for the Protocol application. The Coalition's Data Information Flow project, which sets out to address the key barriers to data access for natural capital assessments, represents another example of an initiative trying to fill important data gaps (Natural Capital Coalition 2019).

3.2.2 Stakeholders and networks

Businesses have an advantage in contexts where multiple stakeholders share a common understanding of natural capital and collaborate to manage it. This is especially true if the nature of the business requires engagement in the value chain or across partners. Undertaking stakeholder analysis at a landscape level helps to map the relevant actors. This exercise was made more comprehensive through the development and use of the diagnostic tool in the four countries in this report (see section 3.3). The diagnostic tool provided a qualitative set of questions to gauge alignment of the different stakeholders around natural capital principles. Using stakeholder analysis and the diagnostic tool together, allows hubs of interest and the convergence (or divergence) in understanding of natural capital amongst actors to be identified. The following two categories were evaluated by the diagnostic tool:

- **Stakeholders, roles, and consistency:** Is there a common and collaborative mechanism within the supply chain and across different stakeholder groups (e.g., government, private sector, civil society, academia) for adopting natural capital approaches?
- **Platforms for collaboration:** Are there existing network platforms where information and data on natural capital can be shared across stakeholders? Are these platforms able to provide support and/or incentives for more sustainable practices through attention to natural capital? (See figure 7.)

In the Colombia and Indonesia applications, the stakeholder analysis identified two existing organizations that could become a coordinating platform for government, business, and finance stakeholders on the topic of natural capital: the national branch of the World Business Council for Sustainable Development (CECODES) and the National Business Association of Colombia (ANDI). Networks like these can help break down known barriers by demonstrating the opportunities and facilitating a dialogue with government and other market participants.

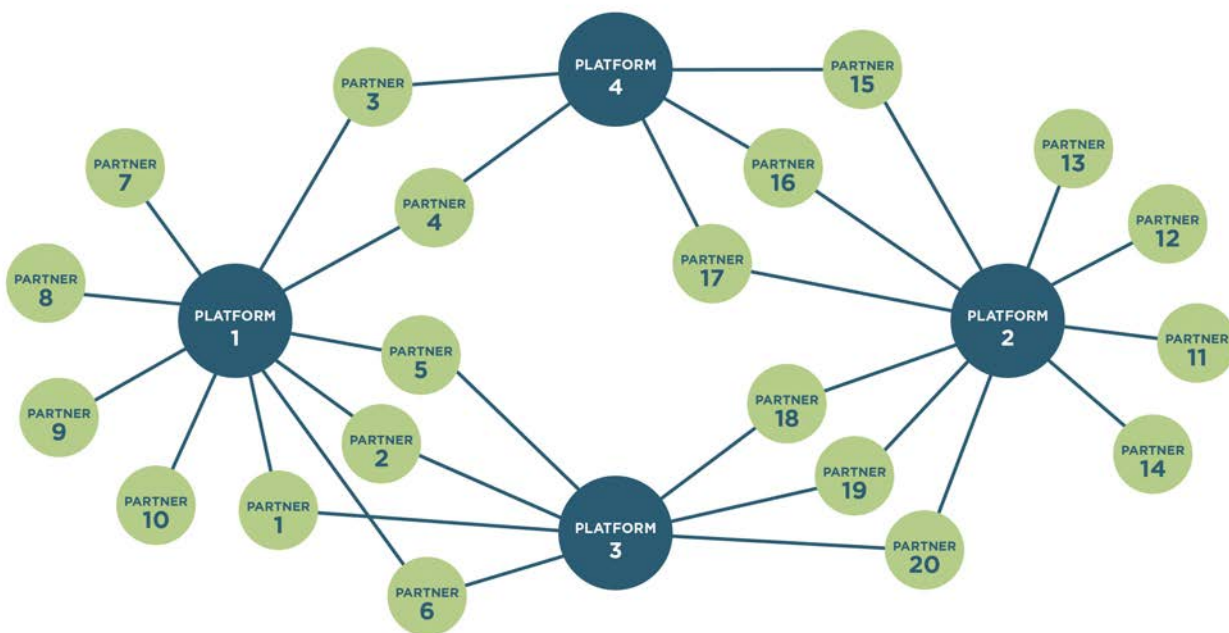


Figure 7. Platform network analysis.

3.2.3 Business and organizational capacity

In contexts where there are supporting tools and expertise, businesses can more easily develop options and solutions and influence other businesses to adopt similar approaches through replication. Where organizational and technical capacity is limited, new adopters can work with others on innovative approaches through partnerships within their networks or by leveraging related platforms. A natural capital approach often requires a new way of thinking and new skills around welfare valuation. While academic training in environmental economics is being conducted more widely, it is still a relatively obscure topic. Few businesses are recruiting in this area, but instead tend to slowly develop skills in-house while drawing upon external expertise for support.

As mentioned elsewhere in this report, various tools are being developed to make it easier for business and financial institutions to evaluate and quantify both impacts and dependencies (e.g., the Natural Capital Finance Alliance (NCFA) tools and many more being showcased in the MIT Shift Natural Capital Tool Kit). While these tools can be extremely useful, it is sometimes difficult for stakeholders to find a tool that does precisely what they need in relation to their local sector-specific natural capital issues. Over time this will change, in part through the development of bespoke tools (as was the case for some of the countries covered in this report).

Training in conducting private sector natural capital assessments is increasingly available. For example, the Natural Capital Coalition has run extensive training courses in Portugal, Japan, and Abu Dhabi. The topic is still relatively new though, and tools and training will continue to be made available throughout the world at a growing rate.

The diagnostic tool examines the number of companies within the country that use some form of natural capital assessment and the available organizational capacity to support delivery and uptake of recommendations in business. It asks:

- **Adoption by private sector:** Are there businesses that already use natural capital approaches and networks that can be leveraged?
- **Capacity:** Are there readily available tools, expertise (e.g., extension services, academics, consultants) to support the use, valuation, and interpretation of natural capital information by businesses, small and medium enterprises (SMEs), farmers, and financial institutions for decision-making?

This element of the diagnostic also includes a consideration for whether financial institutions have access to tools and approaches for estimating the value of natural capital risks relating to business activities. Such tools might include PRI, Equator Principles, ENCORE, and others.

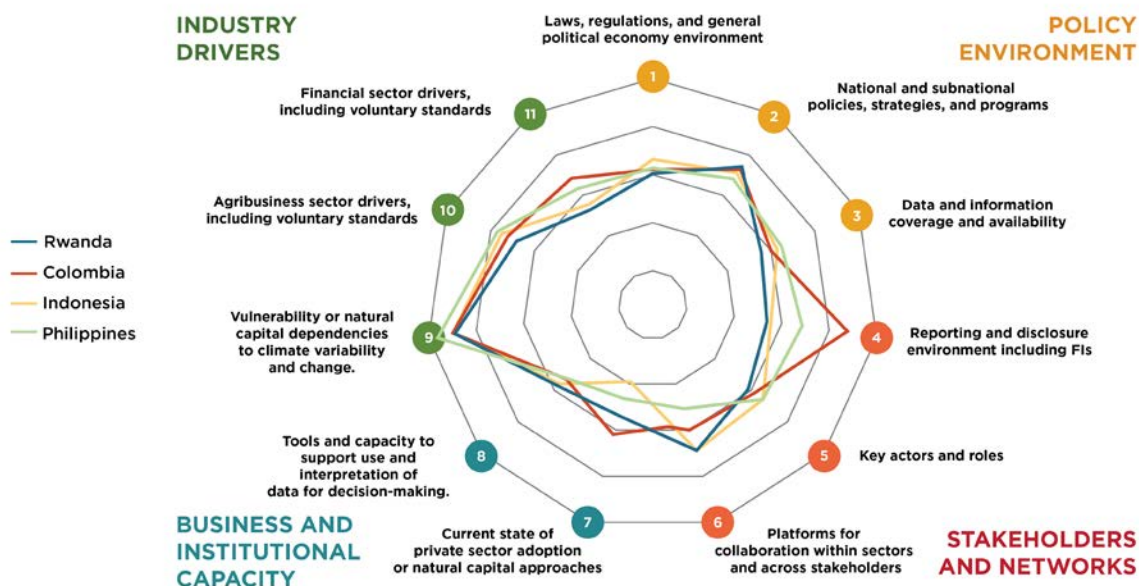


Figure 8. Natural capital diagnostic tool by element and component.

3.2.4 Industry drivers

Industry drivers can accelerate the urgency of shared solutions and can help to influence a broader set of companies to support and adopt similar approaches. This element of the diagnostic, and the components within it, are fundamental to identifying material dependencies, building scenarios, and communicating the urgency of finding shared solutions. Industry drivers can also point to future trends in the industry or sector that might support partnerships and collaboration. The diagnostic tool assesses the vulnerability of the sector to climate change and its dependence on natural capital. Various studies have explored this issue (amongst others) for the tea and coffee sectors, including *The Future of Tea* (Forum for the Future 2017) and *A Brewing Storm: The Climate Change Risks to Coffee* (Climate Change Institute 2016). The future appears somewhat bleak under a business-as-usual climate change scenario, with the latter report stating that climate change is projected to cut the global area suitable for coffee production 50 percent by 2050.

Other aspects considered within the diagnostic tool include the relative significance of the sector within the overall national economy—both for economic growth and social stability in terms of jobs and inclusive growth. Linked to this is the global pressure for the sector to become more sustainable and transparent regarding natural capital impacts and dependencies.

3.3 Cross-country comparison

Insights gleaned at a relatively granular level through the diagnostic can help inform ways for a business to leverage supporting factors and address key constraints within the overall enabling environment. For instance, companies can influence refinement of local laws, institutional capacity building, or development of innovative financing instruments that

The diagnostics asks:

- **Vulnerability to climate shocks and other stresses:** Is the sector vulnerable to climate change or other (e.g., arable land and pollinator decline) shocks that have implications for natural capital dependency—both directly and along the value chain?
- **Sector significance and global pressures:** Is the sector important in the economy nationally (e.g., for GDP) and locally (e.g., for jobs)? Are there global pressures related to natural capital that can help drive improvement in natural capital management?

The extent to which the finance community is supporting the market to address natural capital issues is also important and covered here. In addition to the tools and expertise available to the financial community (see section 3.2.3) is the operationalization of this information in financial decision-making. This depends much more on the cohesiveness and ambition of the wider financial sector to incentivize and motivate natural capital considerations. Specifically, the diagnostic tool looked for evidence of whether financial institutions have systems and procedures in place to assess environmental and social criteria, whether environmental and social issues are included in credit risk scoring, and the extent to which financial institutions provide incentives to businesses that demonstrate natural capital risk management.

can foster broader market uptake of natural capital practices (e.g., in Rwanda). Use of the diagnostic can also help identify potential shared solutions, partners, and collaborations at a landscape level and provide an understanding of shared dependencies on natural capital between companies (e.g., tourism in the Philippines).

3.3.1 Diagnostic findings

In **Rwanda**, the diagnostic highlighted the potential for scaling up a natural capital approach within the sector by building upon the strong national legal and policy context for environmental management and combining this with action across actors. The analysis revealed that multiple tea and agribusiness stakeholders, including private companies, smallholders, public sector representatives, and the financial sector, face intense natural-capital-related climate change challenges. At the same time, the diagnostic identified common characteristics that could be strengthened to help businesses within the sector design resilient solutions. This included demonstrating the national account data that was useful for corporate needs and areas where additional data would be useful, and opening up discussions on how innovative commercial financing, supported by donors, might help watershed management across multiple actors. The findings from the diagnostic coupled with the corporate application valuation spurred interest in setting up sectoral platforms to further understand natural capital approaches and help build resilience in resource use.

In **Colombia**, the diagnostic revealed a positive context for advancing natural capital approaches in the coffee sector. The strongest elements were the supportive government policy environment (e.g., around green growth), industry-specific drivers including local vulnerability to climate change, and emerging global drivers such as consumer preferences for certification and global ESG movements by financial institutions. A financial sector active in sustainability also provided a platform on which to anchor natural capital discussions as an extension of environmental and social risk management. This is complemented by other networks and newly establishing hubs, such as the WBCSD network, that have convening power to promote natural capital thinking and coordinate joint efforts. The diagnostic findings and corporate application were used to bring these actors together to discuss opportunities and synergies and this led to establishing a Natural Capital Coalition regional network in Colombia. Networks like this will be important as industry players are

relatively inexperienced in their understanding of how natural capital can support business growth and resilience. In Colombia, there is limited understanding by companies of natural capital, and limited capacity for data analytics and valuation in a business context.

In **Indonesia** there is also a generally positive enabling context for further integrating natural capital approaches in the coffee sector. A reasonably strong legal and policy environment exists, and sectors face significant threats from climate change. Some government agencies have a high awareness of natural capital concepts, and appropriate legislation is in place. However, environmental issues are not considered through a systems perspective, and laws and regulations are only partially enforced. There are also problems with access to data and methodological consistency. The private sector can play a central role in conserving and restoring natural capital, but their adoption of natural capital approaches in decision-making has been slow. The presence of Olam, Unilever, and Nestlé with their natural capital experience represents a significant opportunity to demonstrate the importance of managing dependencies and to foster dissemination throughout the value chain in Indonesia. Limited standardized approaches for natural capital valuation by the private sector further limit the replication by other market players. Finally, financial institutions tend to have more of a short-term view of risks that is mainly market related, rather than a medium- to longer-term consideration of natural capital dependencies.

The **Philippines** also has a generally positive enabling context for market uptake of natural capital approaches by the private sector in the tourism industry. There is a strong body of law and regulations that govern management of environmental impacts both nationally and in Palawan, but lack of enforcement capacity hinders its effective implementation. While the World Bank Group-led Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership has developed data on ecosystem services in southern Palawan, and various Philippine government agencies collect data on natural capital, it tends to be relatively coarse or limited to a few sites.

This limits what the private sector can easily use to understand their natural capital dependencies and solutions. A strong driver in the industry is the business risk that tourism faces. Both the dramatic increase in visitor numbers and climate change impacts in and around Bacuit Bay mean the situation is reaching a tipping point. This has spurred various local stakeholder groups—including local government, hotel, dive and tour boat operators, and the fishing community—to discuss cooperation efforts to protect the natural capital base on which tourism depends and to limit the negative impact from increased numbers of tourists.

3.3.2 Comparisons

The diagnostic uses four elements, each with underlying components, to establish how an industry operating within a country is performing in terms of its level of sophistication on natural capital uptake. The five-point scale (five being the most advanced) helps to reveal the relative strengths and weaknesses in the different components. This should be thought of as an indicative guide rather than a definitive comparison. It helps to visualize a market's progress in adopting natural capital approaches across market actors and to better understand what might drive change in the market to foster broader adoption. It can also suggest what might be useful for replication in other countries.

The four countries assessed all demonstrated **industry drivers** that influenced the interest in and need for natural capital approaches. This is not surprising given the dependency of the food and beverage and the tourism industries on natural capital and the possible climate change scenarios that affect the natural resource assets these industries rely on. This may imply that while having the right policy environment is important, it is not the most significant driver for action on natural capital uptake by the private sector. The comparisons also showed that in all instances, in-country capacity to support companies by supplying data and technical skills is important for uptake—but the quality of available capacity varies.

At a more granular level, the categories shed additional light on key areas of weakness in shifting the industry to broader uptake. For instance, while the **policy environment** is generally strong in all

The situation is far from unique in the Philippines, as recently evidenced by the six-month shut down of Boracay in 2018. The Ten Knots Group natural capital assessment provides a compelling example that could be replicated across the Philippines of how a natural capital approach can be used to inform an optimum solution for managing shared natural capital dependencies at risk. Stronger government capacity and standards, and incentives set by financial institutions, can help foster greater integration of natural capital assessments in the private sector.

cases, enforcement is weaker in certain country contexts, such as Indonesia and the Philippines. In Bacuit Bay in the Philippines, the lack of enforcement of environmental regulations is perhaps one of the biggest issues facing the tourism industry. This has manifested itself through uncontrolled coral blast fishing in the past, and more recently, poorly planned tourist developments and sewage control, and poorly enforced boat anchoring and trampling of corals by visitors. These actions continue to degrade the corals, water quality, and fish populations that the tourism industry depends upon.

Data and information coverage appears to be weaker for Colombia and Indonesia than for Rwanda and the Philippines. This may relate to the extent of support provided through the WAVES program. Recurrently we found that information collected at the national level for national accounts (e.g., through WAVES), while useful to an extent, is not sufficiently granular for businesses that require very site-specific information, or data are not easily available for business use. In many cases, businesses are not even aware that such data exist. Smallholders and small and medium enterprises (SMEs) had limited incentive to collect information needed for natural capital valuation. This may be due in part to the increasing growth of certification schemes that do not incorporate natural capital dimensions.

Reporting and disclosure by companies appears to be moderately strong in Indonesia. This is both in terms of reporting initiatives placing emphasis

on the environment and the finance sector encouraging companies to report on natural capital risk. Indonesia also has industry organizations encouraging corporations and companies in their supply chain to participate in reporting. This evolves around sustainable commodity certification, zero-deforestation commitments, and REDD+. It should be noted that reporting requirements tend to relate to measurement and do not go as far as valuation. Therefore the relative importance, and value, of natural capital impacts is lost in disclosure.

When it comes to key roles played by **stakeholders** in providing a supportive context for companies to adopt a natural capital approach, active NGOs and civil society organizations (CSOs) provide a particularly strong role in the Indonesia, Rwanda, and Philippines cases, and to a slightly lesser extent in the Colombia case.

An exception to this is Rwanda where collaboration appears moderately strong, with plenty of agribusiness and environmental platforms. A national platform for natural capital accounting in the public sector is exploring how to bring in the private sector.

A mapping exercise of networks, platforms and stakeholders in Rwanda informed the development of a multi-stakeholder platform (figures 9 and 10). The exercise revealed 16 multi-stakeholder platforms that focus either on natural capital, natural resource, agribusiness, and/or smallholder agriculture. Two demonstrated the most favorable characteristics for

promoting a natural capital approach in business: Wealth Accounting and Valuation of Ecosystem Services (WAVES), closely followed by the Science for Nature and People Partnership (SNAPP), but these both lack private- and financial-sector engagement.

In Colombia there is a noticeably more active group of networks and potential platforms to work on shared understanding of natural capital dependencies. This includes the national branch of the World Business Council for Sustainable Development (CECODES) and the National Business Association of Colombia (ANDI). Either of these would be suitable as an organizational home of a natural capital platform as we have seen being established in places such as Spain, Brazil, and Mexico. There is already some supporting activity such as Protocol application workshops in Cartagena, Colombia. Networks like these can reduce barriers, demonstrate opportunities from measuring and managing natural capital, and facilitate dialogue with government and other key players.

In all cases, there are few examples of companies that have adopted natural capital approaches. Limited tools and expertise are available in these countries to support companies, and while there is public sector activity in natural capital accounting, this has not yet translated into the capacity needed for the private sector. Also, since most natural capital applications are used for internal decision-making rather than public disclosure, it is difficult to know whether or not companies are using them.



Figure 9. Network and platform mapping: Rwanda

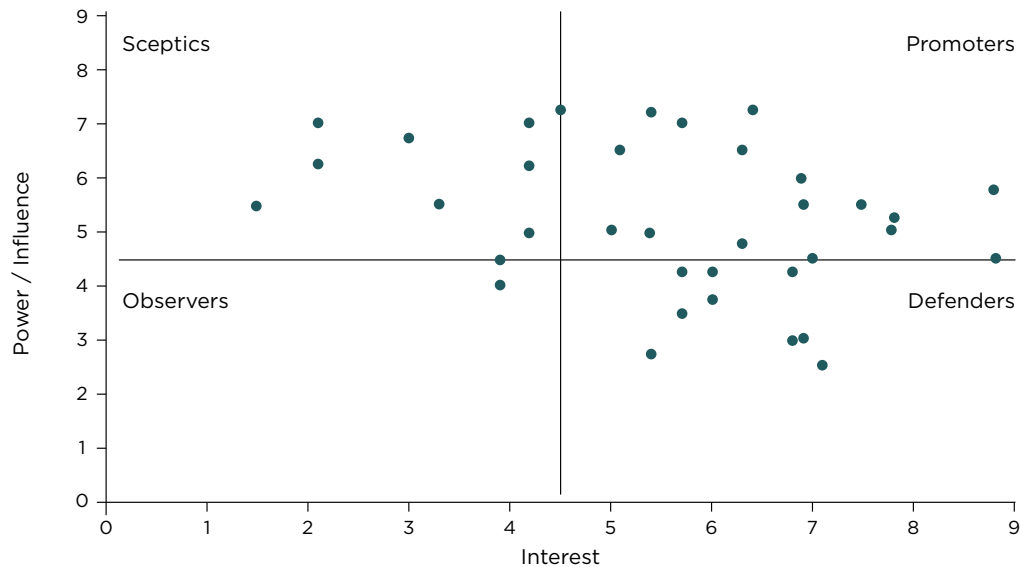


Figure 10. Illustrative stakeholder mapping: Rwanda

Of the four countries assessed with the diagnostic tool, Indonesia had the most experience with private sector adoption of natural capital approaches, mainly by international companies like Olam, Nestlé, and Unilever.

Demonstration by major companies can highlight the business case for other companies, while partnerships with government can identify supporting tools and information that may be useful for companies refine their approach. This can also include highlighting where multiple companies may share a dependence on a natural asset and can identify solutions that increase the overall resilience and sustainability of their businesses. Collaborative solutions can generate additional shared value and decrease costs.

For instance in Rwanda, The Wood Foundation Africa responded to their natural capital assessment by subsequently engaging two other major international agribusiness companies with whom TWFA were partnering to develop new tea plantations and factories in the country. To do this, TWFA opened a wider consultation with representatives from other tea and agribusiness companies, the government, NGOs, and the financial sector. Within these discussions, other tea companies stated that they face the same natural capital issues and encouraged other participants to recognize that even if the startup costs are high for more sustainable solutions, they will pay off in soil conservation in the long term.

In all cases, businesses interested in natural capital approaches do not have the tools in country to easily adopt such approaches. For smaller businesses and landholders, the time and resources required deter their engagement and entities that might encourage the use of natural capital approaches such as extension services and agents, or certification approaches and outgrower schemes, do not include natural capital considerations.

The assessment also helped to identify externalities that may require changed practices to address. These changes come with costs, and small businesses and farmers have little surplus to realize any longer-term benefits that may accrue. By working through industry and value chains and across landscapes, different actors can contribute to the application, sharing experiences and costs.

Use of geospatial information and remote sensing images can be extremely useful at a landscape level for generating maps and calculating areas used in the valuation scenarios. Several of the country level diagnostic assessments used the World Bank Group Geodesk mapping service. The Rwanda assessment used InVEST to help with valuation of some of the scenarios. However, although free to use, InVEST requires a considerable amount of data and expertise to apply. An alternative is to develop and use a bespoke spreadsheet model, as was done for the Philippines assessment.

Innovations in remote sensing and other forms of data capture will revolutionize what can be achieved in the future. Making it easier to select the best tools to use, for example through using the Natural Capital Toolkit interactive database of tools, is also important for broader uptake.

Specific industry drivers for companies to adopt a natural capital approach, including voluntary standards, were again a moderately strong factor for all the country cases. The importance of the tea and coffee sectors in Rwanda, Indonesia, and Colombia combined with global pressures for these sectors to adopt and report on more sustainable practices becomes a strong driver for international companies operating in this space. Intense competition in the market as well as climate change threats and dwindling resources mean that leading agribusiness companies are testing out a natural capital approach to see what advantages it can offer.

Sustainability and fair trade certification have played a significant role, but additional thinking beyond these initiatives is needed to address the more challenging landscape-level problems increasingly facing the agribusiness sector. In the Philippines, the drivers for applying the Protocol were rapidly developing tourism (around 30 percent increase per year) and the fragile location where there was inadequate tourism management. In addition to these drivers, climate change impacts are destroying the natural capital upon which the tourists and local economy depend.

3.4 Finding shared solutions and innovation across public-private-financial sectors

Bringing the value of natural capital and a strong diagnostic to stakeholders in a landscape can create win-win solutions for shared dependencies. Armed with a natural capital assessment and a diagnostic assessment of both the contextual and stakeholder setting, businesses can set out to influence not only their internal stakeholders, but also those who are stewards or beneficiaries of the natural capital base and the services and benefits they provide. The findings of this report suggest that, together, these tools (i.e., corporate natural capital applications, the

The country level diagnostic assessment revealed mixed drivers and weak evidence of natural capital thinking in the financial sector in all four countries. However, this sector represents significant potential opportunity for furthering natural capital uptake. Indonesia fared best out of all the countries in the diagnostic assessment. Despite leading the way, obstacles in Indonesia remain due in part to the long gestation periods for natural-capital-related benefits to materialize. Meanwhile the current financial perspective is short term with a focus on market-related risks. Key financial institutions such as BankRakyat Indonesia (BRI) and Business Network International (BNI) do not yet have systems and procedures in place to assess the environmental and social aspects of borrowers. Indonesian banks are required to have companies report on environmental impact assessments and PROPER (Program for Pollution Control, Evaluation, and Rating)—hence coming out better than other countries in the assessment.

On a more encouraging note, Indonesia, Colombia, and the Philippines are amongst the 35 member countries of the Sustainable Banking Network (SBN). This could be an appropriate organization to promote the wider adoption of natural capital thinking within the finance sector. Furthermore, the NCF's ENCORE tool could be a useful tool to help build capacity in financial institutions on the topic.

country level diagnostic assessments, and network/stakeholder mapping) are extremely effective in identifying the most appropriate collaborative solutions and informing how they can best be financed. Harnessing the communicative and catalytic power of multi-stakeholder benefits—whether accruing to other businesses, SMEs, and/or local communities—can help justify and finance implementation of priority actions to preserve the natural capital base and increase the sustainability of the services and benefits it provides.

Natural capital applications, as well as broader risk management experience especially around cumulative impacts, reveal that a business can sometimes only do so much on its own. This may be to initiate site improvements (e.g., water efficiency measures) or develop internal databases of information to inform business-wide decisions and comparisons between internal programs. In the case of traditional water management, for example, most businesses still tend to focus on internal water efficiency measures to reduce their water footprint. Typically, they will start off with some low-hanging fruit, such as cost-effective water reduction or recycling measure. Once the initial savings have been identified and implemented, it may be more cost effective to help finance another activity in the same catchment. This is precisely the situation facing a Californian manufacturing company. Over the years, the company has spent increasing resources to reduce their water footprint. It is now exploring alternatives through a natural capital assessment lens. One option is to treat part of South

San Francisco's wastewater on their site and provide surplus treated water back to the city. Another is to consider contributing to water-saving projects elsewhere in the same catchment where the water savings are more cost-effective and other co-benefits are generated such as recreation, biodiversity, and carbon sequestration.

Another example of public-private-financial collaboration can be found in Brazil's Cerrado region, where a new climate-smart investment scheme has facilitated investment from private and public sector actors into the local ecosystem (IUCN 2019). The Cerrado Water Consortium, supported by IUCN, plans to invest in protecting the natural ecosystems found on 124 properties along the Feio River basin, which has been threatened by unsustainable land use, inefficient water use, and climate change. The region is responsible for 12 percent of national coffee production, and therefore carries a strong incentive for responsible management.

BOX 6 • PROVIDING DATA COMPANIES NEED: SEEA, WAVES, AND REMOTE SENSING

Natural capital assessments are typically data hungry. Whether undertaking an assessment to aid business decision-making or a government producing a set of environmental accounts, an extensive amount of data is usually required. It is possible though to undertake assessments using a number of assumptions and by drawing upon information collected by others. An ideal situation is for government accounting initiatives, such as applications of WAVES and SEEA, to provide useful datasets to inform corporate applications, and vice versa. Indeed, both can and should act as drivers for each other.

The Rwanda and Philippines corporate applications highlight potential synergies and gaps in data availability and requirements in terms of WAVES accounting and a landscape-level natural capital assessment for a business. The Rwanda assessment drew extensively on data collected for the Rwanda WAVES program and used these data to apply the sediment impact modeling component of the InVEST tool. This enabled a monetary value estimate to be made of the potential benefits to downstream farmers arising from reduced sedimentation impacts as a result of converting annual crops to tea cultivation and contour planting within the upper watershed. The data required included land cover, topography, rainfall erosivity, and soil erodibility data. Access to these data allowed for relatively accurate estimates to be determined which would otherwise not have been possible.

The Philippines assessment required detailed information on coral reef extent and quality, as well as water quality and fish catches throughout Bacuit Bay. This type of information is included in some of the experimental ecosystem accounts being developed in Palawan under the WAVES partnership. For example, the Pulot Watershed and Laguna de Bay Basin and the municipality of Sofronio Espanola ecosystem accounts in Southern Palawan capture information such as coral reef, mangrove, and sea grass extent and condition, pollution loading, sediment inflow, fish production, and resource rent. All of this information would have been extremely useful to inform the Bacuit Bay assessment. Much of this data did not exist at the time of the assessment, and the elements of it which did exist were time-consuming to identify and obtain. Furthermore, the island-wide Palawan tourism ecosystem account currently only covers land-based ecosystems.

BOX 6 • PROVIDING DATA COMPANIES NEED (continued)

This means the accounts might capture the tourism value of terrestrial habitats (including beaches, caves, and mangroves) in Palawan, but excludes the sea, lagoons, sea grasses, and coral reefs. This results in exaggerated values apportioned to each terrestrial habitat and zero values associated with marine habitats. The Philippines assessment highlighted how valuable marine ecosystems can be and thus recommended a change in the scope for developing tourism ecosystem accounts.

The Colombia and Indonesia case studies on the other hand revealed that data for national accounts may not always be as granular as is required for some business natural capital assessments. What a business assessment is trying to do, and how, determines the link between business assessments and government accounts. This is one of the key areas that the Natural Capital Coalition's Combining Forces work is exploring further. This suggests that business uptake of natural capital assessments could be a powerful driver for more governments to undertake natural capital accounting.

More and more, complex dependencies (e.g., quality of coral reefs for tourism) and landscape-level challenges (e.g., water availability or variable flooding in a supply chain for an agriculture company) will require solutions that are beyond the responsibility or ability of a single firm. Similar challenges include the risks and impacts of multiple wind farms on migratory paths for birds, or cascading hydropower developments in a single watershed affecting the same ecosystem services or biodiversity values. A business may be unaware of these impacts and dependencies. Or if aware, the business may take a traditional approach to identify problems, implement direct programs to deal with its direct footprint, and then point to government and other stakeholders in the landscape to act. In some cases, industry players might come together around a long standing, intractable risk—such as deforestation due to land-use change. Farm-based programs, community social programs or voluntary industry standards may be a starting point for future collaboration especially in countries with weak regulatory enforcement or institutional capacity limitations. Natural capital assessments might also provide additional insights into the growing practice related to cumulative impact assessments.

A corporate natural capital assessment and diagnostic of context and stakeholders can add value to these practices and increase the likelihood that longer-term solutions emerge. The assessments show tangible benefits that business and stakeholders involved can

recognize, putting the concepts of natural capital into relative terms that speak to the stakeholders' interests and concerns. When evaluated under different scenarios—whether exploring climate, economic, or industry trends—externalities become even more pronounced, as does the urgency of action.

By knowing where a landscape of actors stands within the four diagnostic elements, shared solutions can be identified. Solutions can depend upon complex financing requirements to balance out the costs and benefits for the different stakeholders through various offsetting and other incentive measures. This includes, for example, market-based mechanisms such as payments for ecosystem services, targeted government programs (e.g., extension service support, capacity building), and/or collaborative projects and platforms.

Such shared solutions face challenges to successful implementation. For example, there can be high upfront costs with benefits only accruing over the longer term. The underlying science behind the assumed cause and effect relationships can be uncertain, and there can be complex legal issues to resolve. Other relevant barriers identified by companies participating in natural capital assessments include institutional inertia, a lack of human capital and the skills needed to collaborate, a presumption that natural capital assessments are too technical or difficult, and the benefits of action not being obvious enough.

3.5 Messages from experience

Experience with landscape-level solutions from the corporate applications revealed a number of clear messages on the optimum solutions to capture shared value and preserve natural capital over the longer term. Each business, whether a global agribusiness, a smallholder farm, or hotel resort, was able to see the value of the natural capital base and anticipate changes to those resources, under different climate, environmental, or sector growth scenarios. Solutions were often complicated, involving the need for upfront investment (e.g., for contour planting and agroforestry and other watershed protection measures) or action across the market (e.g., shift in number of tourists to an area, and uptake of farm-level practices).

At the same time some of the positive benefits accrued to others in the landscape, for example, through reduced sedimentation downstream, greater water availability and quality, carbon sequestration and improved biodiversity values. As such, these are positive externalities not captured financially by the actors who would traditionally pay for the measures that generate them. The solutions thus provide broader social outcomes such as more reliable income streams (e.g., to farmers), additional recreation opportunities (e.g., to tourists and local villages), and longer-term viability of businesses associated with the natural asset (e.g., for farmers and dive operators).

Because these shared benefits do not come at a cost to the beneficiaries, there is an obvious step toward blended public and private financing. For example, public-sector support for contour planting or watershed management, or for payments for ecosystem services, might help to provide an adequate financial benefit to make private investment worthwhile. Or a water treatment plant may contribute financially to help pay for changes in farmers' agricultural practices upstream, reducing the plant's need for expensive and polluting chemicals, and disruption of water supply, a situation that is analogous to catchment management efforts in hydroelectric power projects.

In Rwanda, the natural capital valuation approach spurred discussions with industry tea companies, government, NGOs, and donors on the shared interest at a catchment level in a more reliable income stream for farmers and the associated investments needs. The proposed conversion of annual cash crops to higher value tea using contouring would mean higher upfront costs and a delay in returns for five years until the tea plants mature. The additional costs of the contouring would pay off in the long term through better soil retention and thus higher long-term tea yields, but it would also provide positive externalities to farmers downstream through reduced sedimentation and thus higher yields for them. With ongoing climate change likely to increase severe rainfall and runoff, the perennial groundcover provided by tea plants and the contoured landscape would enhance resilience and yields both on and off site for the foreseeable future, also helping to reduce Rwanda's severe problem with landslides.

These discussions and solutions were timely given the Rwanda government's tea expansion plans that face similar challenges in relation to climate change and offer similar opportunities. The assessment also fostered a discussion on innovative financial products that can cover these upfront costs.

The Colombia Nespresso assessment focused on a shared dependency (water) for a number of their coffee supplier farms within a broad landscape, but did not investigate water availability and use by other stakeholders within the catchment. The work nonetheless showed Nespresso that moving towards community milling and more efficient water use technology would be beneficial to its AAA farmers and society, particularly in water-scarce years. It also highlighted that a broader-landscape natural capital assessment focusing on water and wider stakeholder use could provide valuable insights to identify and evaluate potential options for improved water infrastructure (e.g., simple irrigation) and management within whole catchment areas.

The Nespresso study also identified the opportunity to work with the government on the provision of data to further natural capital assessments and to explore extension services or other mechanisms to expand benefits to include farmers outside of the program. The diagnostic pointed to a mismatch between water-related data supplied by national and local statistics and the data needed by the company for a farm-level assessment such as the one undertaken here. Farm-level water assessments require much more granular data about water use on individual farms and nearby water catchment availability. The available national and local statistics may have been more appropriate for a broader catchment-wide study, than a farm level assessment. The assessment demonstrated the barriers posed by needing natural capital data at different spatial scales, and the opportunity that could come from stakeholders sharing their data with each other to build a full picture.

In all of the country level diagnostic assessments, national-level natural capital accounts (e.g., WAVES and SEEA accounts) provided high-level contextual information that was useful as background for the corporate assessments. Catchment-level accounts (e.g., such as those developed for Southern Palawan in the Philippines) are potentially of much greater value for the assessments but require much more time and resources to collect, which can be difficult for countries to finance and justify.

Remote sensing, machine learning, artificial intelligence (AI), blockchain, and big data can all potentially provide additional relevant information that would help governments and companies establish catchment-level accounts and conduct natural capital assessments (see box 6). For example, providing better maps and estimates of types and condition of habitat cover and values, including for nearshore habitats such as coral reefs and seagrass beds, would be extremely valuable. Remote sensing is already used to help create digitized habitat maps in a cost-effective manner. However, it is still relatively time-consuming and expensive requiring ground-truthing surveys and analytical skills to manipulate the data in the correct way. Machine learning, a subset of artificial intelligence, could certainly help make mapping far more cost-effective in the future.

This would provide support to businesses, governments and financial institutions in applying integrated landscape management solutions.

Olam's assessment in Indonesia also focused on natural capital within the boundaries of a number of its suppliers' farms rather than assessing wider landscape dependencies. They calculated considerable direct potential benefits to their farmers if they changed their farming practices to better take into account natural capital values. Net income could be increased by up to 70 percent from adopting a more organic fertilizer regime, by up to 26 percent through improved water usage and storage, and by up to 38 percent through agroforestry practices such as growing coffee in the shade of Lamtoro trees and intercropping with either vanilla or black pepper.

The assessment also highlighted how positive externalities could be generated through co-benefits to multiple stakeholders. Olam were able to identify how benefits were spread along the value chain; for example, to Starbucks (in terms of reputation and reduced supplier footprint), to stakeholders within the landscape (in terms of improved ecosystem services and biodiversity), and to global stakeholders (from enhanced carbon sequestration and reduced climate change impacts). This suggests a case for shared financing of investments. For example, Starbucks and Olam could potentially pay a premium to the farmers, and the government or other market mechanisms could contribute for the water, biodiversity, and carbon benefits. The financial savings to farmers from reduced water consumption also suggests considerable scope for exploring shared water-management solutions within the catchment through a wider natural capital assessment and stakeholder analysis.

For the Ten Knots Group, the corporate application and diagnostic assessment revealed an alternative enhanced management option that could provide a self-financing, mutually beneficial outcome for Ten Knots Group, SME boat tour and dive operators, local fishermen, and the local and national governments. The local government and stakeholders were already collaborating and establishing a plan to help manage tourism development and the environment in Bacuit Bay.

The natural capital assessment provided compelling additional arguments, including estimates of financial returns to key stakeholder groups, to build a strong case for greater cooperation, changing the protected area management structure and promoting certain management techniques. A core solution proposed was to adapt the protected area management to a public-private partnership model, with greater use of private-sector business acumen and administrative efficiency. The tourist willingness-to-pay survey (a key natural capital valuation technique) undertaken as part of the assessment helped demonstrate a strong financial case for increasing the existing environmental tourist tax to help conserve the environment through helping to control visitor numbers (through visitor number caps) and result in greater long-term returns to the boat operators, hotels, and government.

This assessment increased opportunities for stakeholder engagement and introduced a new sense of optimism to improve management of the steady rise in potentially damaging tourism. Through greater cooperation and transparency, the SME boat tour and diver operators could collaborate with the government to diversify tours, control boat numbers, and use price discrimination (i.e., variable pricing) to maintain and enhance profits and protect the shared natural capital dependencies for the future.

Several other corporate natural capital assessments have highlighted the need for developing shared solutions for dealing with shared problems. One of the biggest issues to deal with is in terms of natural

capital data. The lack of appropriate data is relevant for both natural capital impacts and dependencies. In response, HUGO BOSS has a collaborative approach to obtain better natural capital data. Due to the difficulty in collecting reliable data along the complex value chain, HUGO BOSS founded, along with other partners, the World Apparel & Footwear Life Cycle Assessment Database (WALDB). Over 300 data sets on the environmental impact of clothing products and footwear have already been collected, based on primary partner data and scientific studies. This database, which is continually being expanded, makes it possible to reliably establish the environmental impacts of the various supply-chain processes, such as CO₂ emissions or the use of water or land.

Other corporate Protocol applications such as those by Jaguar Land Rover have also highlighted the need for, and lack of, relevant data to undertake natural capital assessments. The Natural Capital Data Flow project found similar challenges (Natural Capital Coalition 2019). This points to the need for businesses within the same or different industries, and those with similar types of natural capital issues, to work collaboratively to fund and develop a relevant database of information to enable cost-effective valuation of impacts (and dependencies) drawing upon other existing databases where possible.

This section highlights the opportunities for collaboration between stakeholders, such as through more open communication and data sharing. This collaboration can help accelerate the benefits and shared resilience across the system as a whole.

4. Delivering resilience on the foundation of sustainability

Expanding on the previous sections, section 4 proposes that identifying and implementing shared solutions to better manage shared natural capital dependencies and impacts can deliver enhanced business resilience. It also introduces three factors that are required to secure this outcome. These are that: i) natural capital needs to be made more resilient itself; ii) an integrated capitals approach must be adopted; and iii) the right enabling environment is needed just as much at the international level as the national one.

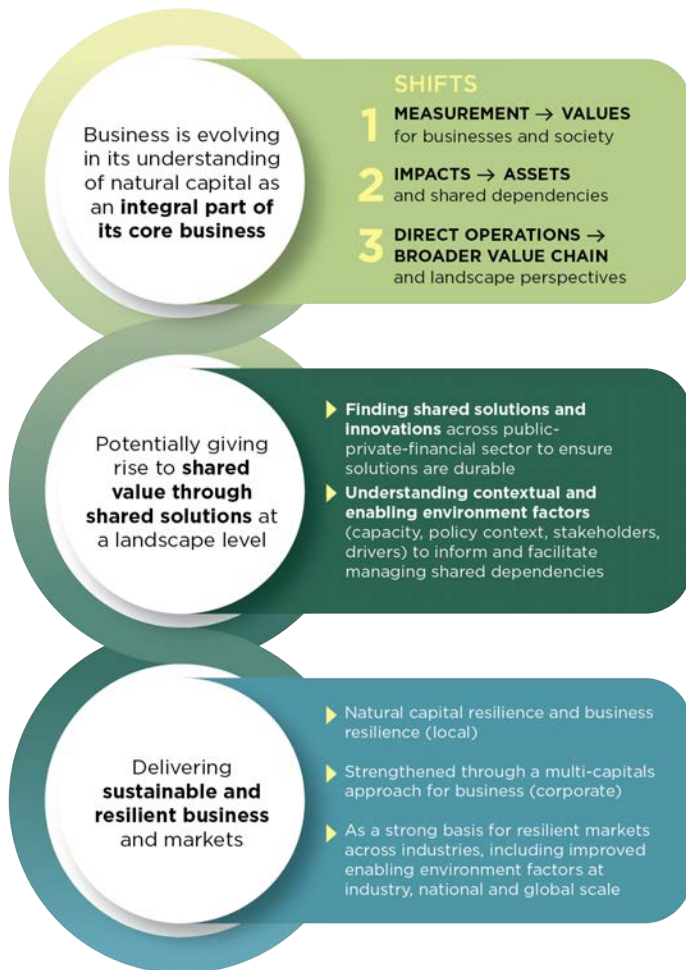
The adoption of a natural capital enables greater awareness of sustainability and resilience within business, delivered within the context of local, national, and global development objectives. See Figure 2, replicated below. The starting point for this sustainable growth requires building (or rebuilding) a resilient natural capital asset base. Unfortunately natural capital is declining in most areas of the world. Preserving natural capital is important for business stability and access to long-term flows of ecosystem services, and for helping businesses demonstrate that their activities are not degrading the asset base and compromising the ecosystem services upon which other stakeholders depend (thus maintaining their reputation and social license to operate). Leading businesses are recognizing this, hence the significant growth in sustainability and impact-driven business. To deliver truly mutual benefits, it will be essential for businesses of the future, including smallholder farms and SMEs, to generate shared value amongst a broad set of stakeholders.

Other types of capital, such as human and social, are intertwined with maintaining natural assets and ensuring their resilience. Leading businesses realize that natural capital as part of decision-making must be complemented with social and human capitals—for workers, communities, and society. It is important that people within communities and the landscape have jobs, an income, and appropriate capacity building, and that local and national governments deliver services such as education, health care, and infrastructure that society requires. Without society's broader needs met, inequality and social unrest could threaten natural capital and business resilience. Adopting a multi- and even better, an integrated capitals approach that takes into account the system and its inter-connections between all the capitals will strengthen business resilience further than including natural capital alone.

To achieve more sustainable and resilient businesses, especially in challenging contexts, the enabling environment at a national and internal level plays an important role. This includes the right incentives, effective regulations, and enforcement. Examples might include pricing policies, payments for ecosystem service schemes, removal of subsidies that have a perverse effect, regulation of certain products and activities, protection of key habitats and ecosystem services, and requiring businesses to fully report on the non-financial impacts of their business operations and value chain.

4.1 Natural capital resilience and business resilience

Figure 2. Natural capital shifts leading to resilient and sustainable markets.



Enhanced natural capital resilience can strengthen business resilience. Resilient natural capital refers to a healthy stock of land- and water-based habitats that can better withstand climate change and other shocks. Adopting a natural capital approach helps to justify maintaining the natural capital asset base for continued long-term flows of multiple ecosystem services. This includes maintaining essential provisioning services (e.g., food, fibre, water) whilst retaining regulating services (e.g., storm and flood control and water retention) and cultural services (e.g., recreational, aesthetic, and spiritual benefits). To be regenerative, businesses and their value chains need to have an overall net positive impact on natural capital.

In the Ten Knots Group case, the natural capital assessment argued that enhancing management of the marine resources in Bacuit Bay would maintain the integrity of the coral reefs as best as possible. Enhanced management would protect the Bay from stresses such as poorer water quality and trampling by boat tour visitors, and support coral restoration measures such as reattaching broken corals. These interventions would make corals more resilient to increasing incidents of coral bleaching from higher water temperatures in the Bay. The assessment argued that enhanced coral resilience to environmental shocks through better management would improve Ten Knots Group's, as well as dive and boat tour operators', resilience and profits in the long term. In addition, enhanced coral reef quality should improve fish productivity which would also provide greater food security for local people in the future. Vibrant coral reefs and abundant and highly diverse marine organisms associated with reefs can also enhance the resilience of local people, effectively acting as an insurance policy by providing continued access to food after major typhoons or tsunamis destroy other food sources. The Philippine assessment also proposed that the tourism businesses could increase their profits and resilience through diversifying their tourism offerings away from just a small selection of fragile sites.

Using natural capital approaches can help businesses become more resilient through better understanding the environmental challenges that may face them in the coming years. For example, in the case of Nespresso in Colombia and Olam in Indonesia, the Protocol assessment highlighted and quantified the extent to which water may become a potential problem for coffee growing due to climate-change-induced droughts. It was found that smallholder farms could increase their incomes and resilience to potential droughts by implementing various water-saving technologies and management approaches. The most significant improvement could come through a shared cooperative approach to milling and water use.

For both Olam in Indonesia and TWFA in Rwanda, opportunities to improve smallholder resilience and incomes were identified through changing farming practices. In the former, resilience could be enhanced through greater use of organic rather than inorganic fertilizer, shading the crops with Lamtoro trees to protect against occasional volcanic ash deposition, and switching the intercropping from oranges to vanilla or black pepper to reduce pest infestations and improved profitability. In Rwanda, the assessment revealed that incomes and smallholder resilience could increase from converting annual crops to contoured tea plantations.

Olam has recognized the need for landscape and regenerative approaches to farming activities within their supply chain and recently published the Olam Living Landscapes Policy (Olam 2018). The policy states that “Unsustainable conversion or over-

exploitation of forests and other natural habitats for food, fuel, fiber, and other purposes threatens our natural life-support systems, including soil, air, water, all living things, and the global climate, with serious implications for future generations.” As part of their policy they adopt net-positive principles to put back more into food and farming systems than they take out. This involves taking a regenerative approach that aims to deliver a triple positive impact for: prosperous farmers and farming systems, thriving communities, and regenerating the living world. The latter involves “maintaining or restoring healthy ecosystems that support viable populations of animals and plants (biodiversity), enhancing local ecosystem services (e.g., water regulation, soil fertility, and erosion control), and regulating the global climate (carbon storage and greenhouse gas).”

4.2 Strengthening resilience through a capitals approach

In addition to the three shifts discussed earlier, another trend worth exploring here is the interest of companies to extend the natural capital approach to other forms of capital including social, human, produced, financial, and intellectual. The advantage of considering these other capitals within decision-making is that they cover wider social and economic issues, thereby fully covering the main components of sustainability. Valuation of these other capitals allows greater comparability when assessing trade-offs between the different forms of capital under alternative options, and yield greater allocation and distribution of benefits.

Indeed, a key finding and next step for many of the companies applying the Natural Capital Protocol is to extend their natural capital work to include these other capitals. This was the case for HUGO BOSS and Roche, as well as Natura, Novartis, Skanska and Yorkshire Water. For example, Natura stated that “a key next step for Natura is the valuation of impacts and benefits generated by the business for community development including employment and social enterprise, using a Social Profit and Loss (SP&L) assessment.” In cooperation with other partners, HUGO BOSS has now begun to extend their natural

capital assessment evaluation to also include social and economic factors in order to obtain a more holistic assessment of the various influences. They are actively looking for opportunities to work with partners from the textile and clothing sector, but also from other industries. In this way, HUGO BOSS wants to further optimize their approach to impact evaluation with regard to all three dimensions of sustainability: environment, society, and the economy.

Climate change initiatives have not always considered the importance of nature-based solutions and the trade-offs related to natural capital. This omission has resulted in some well-meaning, but unsustainable solutions such as commitments to biofuels with negative biodiversity and water impacts, or the promotion of diesel cars, which led to significant air-quality impacts in many parts of Europe. There are growing efforts to broaden the climate change agenda to include forms of natural capital beyond carbon only. Examples include the CDP (formerly known as the Carbon Disclosure Project) Water and Forest programs, and a considerable effort from many of conservation organizations and business associations, highlighting nature’s role in climate change.

The Financial Stability Board’s (FSB) Taskforce on Climate-Related Financial Disclosures (TCFD)

guidelines, although originally only focusing on climate change as its title suggests, is now looking more broadly at other aspects of natural capital.

Similarly, the corporate applications touched on the other capitals, recognizing that inclusion of other capitals in future assessments would help ensure more sustainable and resilient outcomes.

4.3 Solidifying the foundational base for resilient and sustainable markets

To further solidify and support this transition, markets must adapt, and all elements of an enabling context mature. Application of the diagnostic helps to understand the level of maturity of a market and the role that each actor in that market can play in achieving progress. The elements explored in this paper—policy environment, business and organizational capacity, networks, and industry drivers, including innovative financial instruments—help facilitate mutually beneficial solutions and market movement towards sustainability and resilience. By adding a resilience lens in the scenario analysis of a natural capital approach, the cases showed the importance of the right policy environment to bring about sustainable business practices, within which natural capital sits. To build resilience, the cases demonstrated the importance of understanding the industry drivers for natural capital dependency management and contextual factors that may impact natural assets on which business depends. The cases find that a resilient market for natural capital would have to go beyond laws and enforcement to include innovative programs to connect those who are dependent on natural capital, such as through well thought out payments for ecosystem services, and exploration of a range of shocks and stresses to test the resilience of solutions. This could include water treatment and supply companies paying upstream farmers to modify their farming practices (e.g., in Rwanda), and the strategic use of tourism fees to both raise revenues for improved management and to help influence visitor behavior to reduce congestion (e.g., in Philippines) and natural capital management. Such market-based mechanisms are increasingly being advocated and used in integrated landscape management (e.g., Global Canopy 2015).

It is important to understand the national economic significance of a particular industry and the challenges to resilience that it faces.

This also includes awareness of the collaborative initiatives, certification or standards that face the industry, and consumer demands that may shape corporate action. For example, in Indonesia the agriculture sector is significant in terms of economic importance and companies such as Olam, Nestlé, and Unilever have been leading the sustainability agenda. With the Sustainable Trade Initiative (IDH), Nestlé has undertaken significant work in sustainable coffee supply chains; their experiences with smallholders in Colombia could be leveraged to inform smallholder adoption of sustainable practices at the landscape level. Many of the voluntary sustainable commodity certification standards such as Rainforest Alliance or Fairtrade could be adapted to help collect data for more holistic valuation of natural capital and how it affects society.

Climate change will remain a critical driver for many companies. As well as mitigation activities, natural capital assessments can be used to look at adaptation options and business model and product opportunities. Sector-specific climate change impact reports, such as “A Brewing Storm: The climate change risks to coffee” by The Climate Institute (2016), are a useful starting point for considering national and high-level local implications.

In addition, a better understanding of the financial sector within a country or market can be an important factor in creating a sustainable market and innovative financing to help address resilience. Leading financial institutions are starting to apply natural capital thinking in collaboration with the businesses that they are financing, such as occurred in the Netherlands and through the European Business and Biodiversity Platform’s finance work. This can lead to partnerships that strengthen the foundations of sustainability and resilient businesses.

Clusters and platforms matter. Identifying and developing shared solutions through stakeholder collaboration is at the heart of integrated landscape management. Collaboration is invaluable for sharing knowledge and experience around the need for businesses to understand why natural capital matters and how to implement resilient solutions. Collaborative partnerships can also provide important support for businesses when they implement such approaches, giving them a safe space to explore the challenges and identify solutions to what might at first appear to be intractable. For example, in the Ten Knots Group case, a private-public partnership model was proposed as potentially the most effective approach to protected area management and a way to manage and spend revenues for the long-term benefit of all key stakeholders.

4.4 Reinforcement

As mentioned above and shown in Figure 2 (copied in this chapter), considerable self-reinforcement contributes to a virtuous, cyclical process. The three shifts in business thinking around natural capital, together with an investigation of the local context, can lead to the identification of potential shared solutions. These in turn help to build natural capital and business resilience. This can be strengthened through applying an integrated capitals approach, which in turn can lead to durable business sustainability and resilience if the enabling environment is sorted at a market and country level, through resolving market failures and incentivizing sustainable activities. As the business case becomes stronger, more companies will adopt natural capital approaches resulting in greater uptake of an integrated capitals approach and increased demand for a supportive enabling environment.

To undertake natural capital accounting and assessments, the public-sector approach primarily applies the UN SEEA framework, whilst the overarching framework for the private sector is the Natural Capital Protocol. These approaches use complementary valuation techniques to understand the relative importance and worth of

In the UK, the Catchment Management Declaration, which is applicable at a national level, includes a principle that commits signatories to “support action at both catchment and regional scale to deliver multiple benefits through cross-sector partnership and collaboration, recognising that the environment is a system upon which we all depend.” Furthermore, under a UK government-backed initiative, a Landscape Enterprise Network (LENs) approach has been developed, with Nestlé acting as a key player. LENs is about establishing small, mutually beneficial business clusters investing to protect a few select natural capital assets. It is designed to grow incrementally, to create a network where multiple businesses can collaborate to invest in multiple assets, which can deliver multiple functions across the landscape at both catchment and regional scale.

the natural world on which we collectively depend. While businesses and governments often have different aims for their natural capital approaches, and are attempting to capture different kinds of information, the work undertaken by governments can be hugely useful to business and vice versa. Data collected in national-level accounts can be invaluable for private sector assessments, while data collected by the private sector can likewise ensure more comprehensive and robust national-level accounts.

In August 2017, a number of leading organizations involved in natural capital assessments from businesses, governments, consultancies, academia, and civil society agreed to combine forces to continue to support each other’s work to clarify how these approaches overlap and combine. The initiative has led to various materials being developed that support the harmonization of including nature in public and private decision-making. Priority areas for future collaboration and combining forces include: building the community, developing the narrative, harmonizing approaches, and work around data and case studies (Natural Capital Coalition 2017).

5. Conclusions and moving forward

It is clear from the evidence gained over the past few years of undertaking natural capital assessments that a natural-capital-based approach provides a new, more insightful and relevant way for business and governments to address and manage serious environmental challenges. At the foundation of natural capital thinking is an evolution in the way that business perceives its relationship with nature—represented in the three shifts—and the importance of innovative partnerships. This report explored these three shifts:

Shift one: From measurement to values for businesses and society. Natural capital thinking allows businesses to recognize that the environment is something that can have considerable value from both a business and societal (or stakeholder) perspective. Valuation moves away from just measuring numbers to providing us with a powerful way to inform context and trade-offs, and provides additional context for improved decision-making.

Shift two: From impacts to assets and shared dependencies. Natural capital thinking encourages businesses to see not only the impact that they have on the world but how the world impacts them through their dependency on it and how this is critical to their long-term viability. What is becoming more apparent and helping to drive solutions is that dependency on natural capital is often a shared dependency with other stakeholders who also need and value the same natural resource assets.

Shift three: From direct site-level operations to broader value chain and landscape perspectives. Natural capital thinking highlights the interconnectivity between issues, stakeholders, and initiatives within a wider geographic area than just a business's direct site-level operations. This landscape perspective enables companies to find solutions to address their natural capital dependencies and impacts that are beyond their ability to solve alone.

Landscape-level issues require landscape-level thinking. Often it is not evident what responsibility or influence the business has to make a landscape-level approach successful. A first step is a diagnostic assessment of the context within which the firm is operating including the policy environment, institutional capacity and market behaviors, networks and stakeholders, and industry factors.

This insight is valuable in a number of ways. A business can better understand its potential leverage points including possible collaboration with partners or competitors throughout its value chain; innovative approaches, programs, and technologies; priority areas for funding and new sources of finance; and what other resources might be available to support action. A diagnostic approach can also help inform policy actions to support enhanced management of natural capital assets across stakeholders and companies. Identifying and implementing shared solutions to better manage shared natural capital dependencies and impacts can deliver enhanced

business resilience. However, to ensure this is sustainable in the long term, natural capital needs to be made more resilient itself. An integrated approach must therefore be adopted, to see and understand the inevitable trade-offs between capitals. This requires the right enabling environment at a national and international level to support the first-movers and innovators, and provide incentives for more to follow.

Several opportunities exist that should be further leveraged to continue this drive towards a more sustainable and resilient future. Some of these new 'frontier' opportunities are explored briefly in the suggested next steps.

5.1 Deepen collaboration

The many different organizations working on natural capital initiatives provide an opportunity to collaboratively leverage their efforts and avoid duplication. In this respect, the recommendations from the Natural Capital Coalition's Combining Forces initiative report on priority areas for collaboration is a roadmap to follow. These include building the community, developing the narrative, harmonizing approaches, improving data availability, and expanding the suite of case studies (Natural Capital Coalition 2017). Broad communication of plans and initiatives and open collaborative approaches are to be welcomed.

Businesses, financial institutions, and governments would benefit significantly in the long term if they work more closely together to facilitate and support natural capital stewardship.

This is fundamental at a land- and seascape level and requires involvement of all key organizations within a catchment collaborating to help manage and regenerate the natural capital that multiple organizations and stakeholders depend upon. More catchment-level studies would add value to current knowledge by investigating key dependencies and associated risks and opportunities as would collaborative strategies to devise mutually beneficial catchment-based solutions. This is particularly needed around water but also other natural capital. Key is using a valuation and natural capital dependency-based approach, potentially involving public-private partnerships that embrace integrated land-/seascape management that is capable of communicating information to the relevant stakeholders.

5.2 Harmonization

Although considerable steps have been taken in harmonization through the development of the internationally accepted framework for business to apply natural capital thinking, The Natural Capital Protocol, as well as the WAVES Natural Capital Accounting program at the national level and the Natural Capital Finance Alliance's work with financial institutions, there are still significant areas where further harmonization is needed, in the natural capital space as well as in other related areas of the sustainability agenda.

One of these is connecting the approach taken by countries at a national level with the approach taken by businesses, so that cross benefits can be identified and achieved. The four corporate applications provided insights on the similarities and differences between national natural capital accounting and business natural capital approaches. Another area where harmonization is needed is in how companies report to stakeholders and investors about how they create and/or diminish shared value. The majority of business assessments of natural capital are

focused on internal decision-making and are therefore not shared externally. The corporate applications and the country level diagnostic assessments showed the value of shared discussions around natural capital. Integrated reporting uses the capitals as a key part of the principle-based framework and can be very helpful for businesses as they start to think about

how they share their experiences and how this fits their business model and strategy.

Additional harmonization could be around categorization of habitat types, ecosystem services, and impacts, as well as a set of default values that could be used. Steps are being taken to do this through the new Value Balancing Alliance.

5.3 Additional support

It is becoming apparent that there are significant barriers to the uptake of natural capital assessments, with many companies starting on the process but not completing it. The Natural Capital Coalition's (2018) experience confirms this. Barriers include limited understanding of the benefits that natural capital thinking brings, a perception that it is too technical and complicated, and lack of access to the right data, tools, and internal systems to complete an assessment. The most significant barrier though is securing internal buy-in from colleagues. A European Commission campaign, We Value Nature (2020), has been established to try and address these barriers and provide additional support to those that are just starting to apply natural capital thinking.

the larger and smaller companies can support each other through the process. It also helps to make the issue of shared value more obvious to all involved.

Several initiatives are helping expand the scope of application of natural capital assessments, including: Development of Natural Capital Protocol sector guides such as for forestry and financial institutions; providing regional training programs on the Natural Capital Protocol; and establishing regional hubs of Natural Capital Protocol expertise, such as in South Africa and China. The World Bank WAVES program has also helped with uptake on natural capital accounting by numerous governments around the world, including the Philippines, Indonesia, Colombia, Rwanda, Costa Rica, and Botswana, among others. There is also important progress being made on the implementation of System of Environmental-Economic Accounting, or SEEA. Currently, over 80 countries have SEEA work programs supported through various initiatives including the EU-funded program on ecosystem accounting that is run by the UN Statistics Division and covers Brazil, China, India, Mexico, and South Africa.

Another challenge is that although large multinational companies are applying natural capital thinking, it is much more difficult for small and medium enterprises (SMEs) due to their limited resources. A number of efforts have been made to simplify the approach for SMEs, but with limited success so far. The preferred way forward is now seen as working at a local level and through supply and value chains. This means that

5.4 Embracing technology

The various forms of rapidly evolving new technologies can help facilitate adoption of natural capital approaches by addressing challenges with the availability and quality of data. Big data, blockchain, and geospatial imagery can help to develop new technologies and applications for sustainable agriculture and aquaculture (e.g., hydroponics, indoor agriculture, inland fish farming). Collaborative

approaches are needed with open source sharing of advancements. Negative and unintended consequences from such technologies also requires consideration, with adequate attention given to minimizing these through establishing suitable protocols and restrictions regarding potentially adverse applications.

5.5 Sustainable financing

An encouraging trend in the world of finance involves growing interest in sustainable finance in a variety of guises. In particular, there is considerable scope for tapping into the rapidly growing number of green bonds, green lending principles, and blended finance options to help finance sustainability-related infrastructure and solutions at a landscape level. A whole host of market-based instruments continue to evolve, such as payments for ecosystem services, biodiversity offsetting, and carbon offsetting and in-setting.

The market for green, social, and sustainability bonds has grown exponentially from just a few billion dollars (US) in 2012 to over US\$200 billion in 2018, with a total value of outstanding bonds of US\$540 billion at the end of February 2019. Such bonds are raising considerable finance that is being invested in renewable energy, low-carbon buildings and transport, pollution reduction, clean water provision, waste management, and sustainable land and marine resource use-related projects.

Blended finance involves the strategic use of development funds to improve the risk-return profile of investments in order to attract additional private capital.

This approach could potentially leverage significant additional funds to help developing countries deliver on the Sustainable Development Goals—to address basic needs in infrastructure (roads, rail, and ports; power stations; water and sanitation), food security (agriculture and rural development), climate change mitigation and adaptation, health, and education.

Market-based mechanisms related to carbon, water, and biodiversity are becoming significant, with for example US\$3.6 billion being transacted on biodiversity mitigation and US\$1.2 billion being transacted in relation to biodiversity compensation payments in 2016 (Bennett et al., 2017).

Natural capital approaches are essential to understand the success of these investments and to support their further development and help to prove the benefit for further investment. However, in order for this to work we need robust assessments that are comprehensive in scope, transparent in process, and are independently verified. Such measures are needed to help manage risks of natural capital assessment being used in a manner that might lead to unintended consequences or used for political gain, such as those associated with land grabs.

5.6 Adopt appropriate incentive mechanisms

Whilst there is growth in the adoption of a natural capital approach, the current incentive structures still encourage unsustainable short-term behaviors in relation to depleting natural capital. This is particularly true given that many natural capital values are invisible (i.e., outside of market values) and most organizations and individuals are focused on generating financial revenues and profits. This is a complex area requiring a suitable mix of appropriate

“carrots, sticks, and narratives” to change the way that our markets work (e.g., sustainable financing and payments for ecosystem services), to enact smart policies and regulations (e.g., reporting requirements for natural capital impacts and dependencies), and to change social norms through education (e.g., through effective awareness campaigns). Evaluating the enabling environment conditions for a country or region is a good way to begin to explore this.

Annex One.

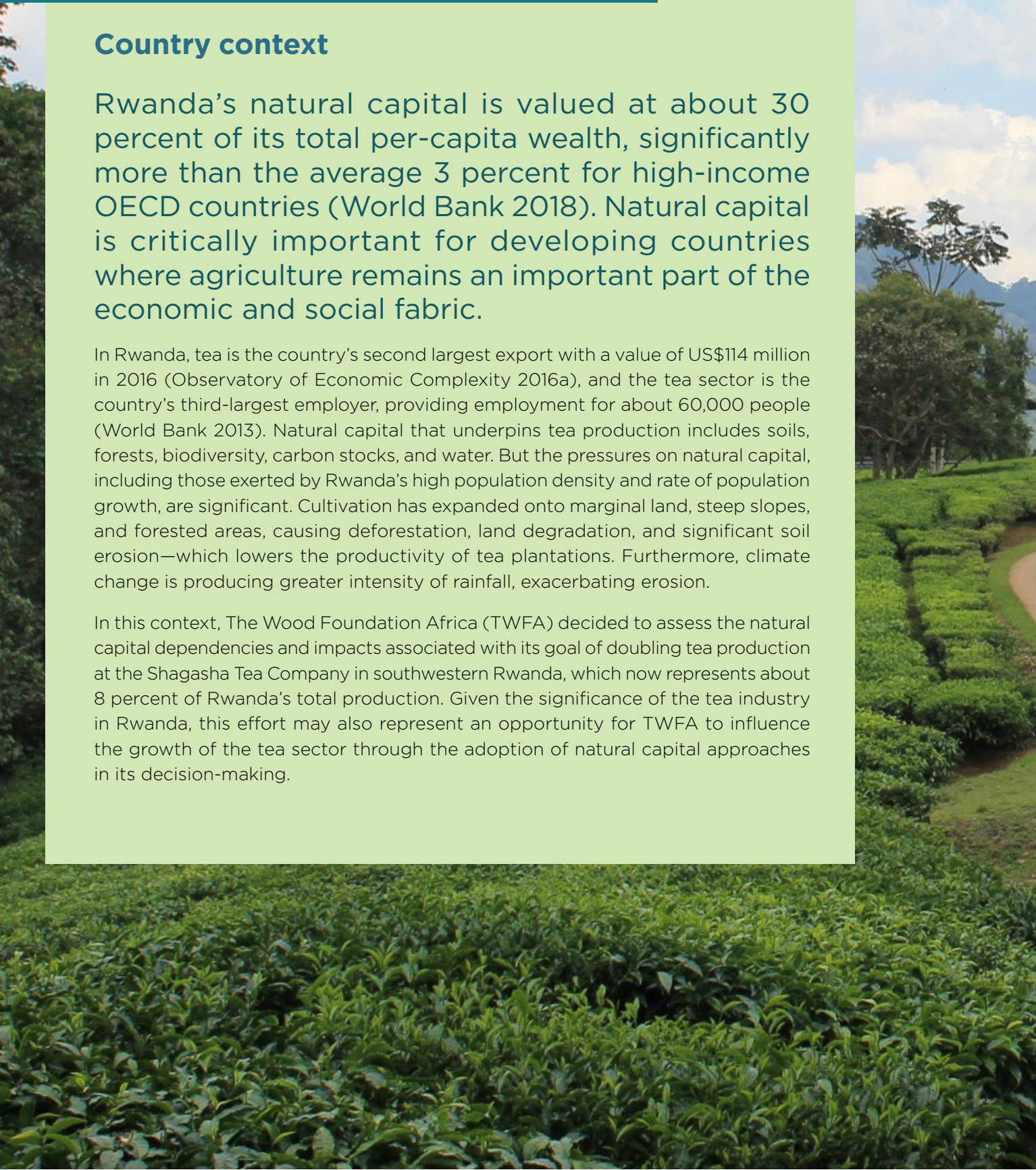
Country level diagnostic assessments and corporate applications

CASE STUDY**Rwanda: The country level diagnostic assessment****Country context**

Rwanda's natural capital is valued at about 30 percent of its total per-capita wealth, significantly more than the average 3 percent for high-income OECD countries (World Bank 2018). Natural capital is critically important for developing countries where agriculture remains an important part of the economic and social fabric.

In Rwanda, tea is the country's second largest export with a value of US\$114 million in 2016 (Observatory of Economic Complexity 2016a), and the tea sector is the country's third-largest employer, providing employment for about 60,000 people (World Bank 2013). Natural capital that underpins tea production includes soils, forests, biodiversity, carbon stocks, and water. But the pressures on natural capital, including those exerted by Rwanda's high population density and rate of population growth, are significant. Cultivation has expanded onto marginal land, steep slopes, and forested areas, causing deforestation, land degradation, and significant soil erosion—which lowers the productivity of tea plantations. Furthermore, climate change is producing greater intensity of rainfall, exacerbating erosion.

In this context, The Wood Foundation Africa (TWFA) decided to assess the natural capital dependencies and impacts associated with its goal of doubling tea production at the Shagasha Tea Company in southwestern Rwanda, which now represents about 8 percent of Rwanda's total production. Given the significance of the tea industry in Rwanda, this effort may also represent an opportunity for TWFA to influence the growth of the tea sector through the adoption of natural capital approaches in its decision-making.



Application of the Protocol

TWFA's application of the Natural Capital Protocol revealed that investments in improving soil stability, as well as tea and fuelwood productivity, will, in the long term, increase yields and smallholder revenues, mitigate business risks, and boost the tea supply chain's resilience to climate change and environmental degradation. Furthermore, the analysis found that reducing erosion can create additional benefits downstream, for farmers and other stakeholders. (For details, see the Rwanda corporate application in Annex 1.)

These findings may inspire a more integrated approach to natural capital in Rwanda's tea sector. For example, tea producers could jointly strategize on the government's plan to expand tea cultivation, in terms of implications for their shared dependencies on soil, water, and fuelwood under a changing climate—as well as the expansion plan's impacts on surrounding landscapes and livelihoods. Results confirm that there is a strong business case for natural capital considerations and that they are relevant at the sector level.

The enabling environment for further uptake of natural capital approaches

Overall conditions in Rwanda are favorable for scaling up natural capital considerations in agribusiness. Besides the pressures on land and the threat of climate variability and extreme climate events, the most compelling factors to persuade more companies to adopt natural capital approaches are strong legal and policy frameworks for corporate environmental management.

The Rwanda Environmental Management Authority robustly enforces environmental regulations and has developed guidelines for environmental audits that parallel many details of the Protocol. Rwanda adequately collects national data related to natural resources and makes it publicly available. However, data from national statistical surveys and accounting systems are not designed for use at the corporate scale. Likewise, national-level projections about the expected impacts of climate change are readily available, but for individual farmers, the information is neither detailed nor reliable enough to be useful. On the other hand, the spatial data based on satellite imagery that is gathered in Rwanda and other countries by the World Bank Group-led Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership is suitable for use at the corporate level, and indeed, was used by TWFA in its work on soil erosion. In Rwanda's financial sector, the National Bank of Rwanda and the broader sector verify compliance with regulations for environmental impact assessments and with environmental audits as part of their due diligence. However, they do not use these tools to assess financial risk related to climate change or other environmental challenges in their lending decisions.

Regarding capacity, most of the government's resources have been focused on collecting natural capital data through its work with WAVES, and few Rwandan organizations could train businesses to assess their natural capital dependencies and impacts. Farmers receive varying degrees of support by companies, agronomists, and agricultural extension agents to measure soil and water as inputs in agricultural production. Corporate-level commitments to natural capital remain limited in number and application. Rwandan banks often do not have the capacity to assign a risk officer to understand agribusiness investments. Furthermore, methods of measurement are not standardized across different stakeholder groups.

Natural capital measurement and valuation are more likely to become mainstream in the agricultural sector if they have the buy-in of established networks, therefore it is recommended to start by introducing natural capital in the meetings of industry associations such as the Rwanda Tea Association, Rwanda Horticulture Working Group, or Africa Fine Coffees Association. On a related front, TWFA has joined with other stakeholders to create a national platform for sharing information about and experiences with the Protocol.

Going forward

To scale up natural capital measurement and valuation, Rwanda must build upon already established public sector and financial sector practices and networks for agribusinesses. In the public sector, the Rwanda Environmental Management Authority could expand use of its environmental audits and environmental impact assessments to include more quantitative monitoring of natural capital, to establish a baseline for tracking change, and for use by the private sector. At the local level, the Ministry of Local Government could use agronomists and Farmer Field School facilitators to strengthen training for smallholder cooperatives on collection of key soil and water data and their use in analyses that include natural capital considerations.

In agribusiness, some small businesses already collect data to make operational decisions and to comply with voluntary sustainable commodity certification standards, such as through Fairtrade. These practices could be adapted to collect data appropriate for more holistic measurement of natural capital impacts and dependencies.

TWFA's work—and particularly the broadening of its efforts to include two major global tea companies that approached it to partner in establishing new plantations and factories—could create a critical mass within the industry to increase uptake of natural capital valuation.

Rwanda: The corporate application

Introduction

Global impact investor The Wood Foundation Africa (TWFA) analyzed the natural capital issues associated with increasing its tea production in Rwanda. The assessment revealed that investments in improving soil stability, as well as tea and fuelwood productivity, will, in the long term, increase tea yields and smallholder revenues, reduce business risks, and boost the tea supply chain's resilience to climate change and environmental degradation. Furthermore, reducing erosion can create unanticipated benefits downstream, for farmers and many other stakeholders.

Cultivation of tea in Rwanda faces various risks. The country has the highest population density in continental Africa and an average annual population growth rate of 2.4 percent. Since 75 percent of Rwanda's population works in agriculture, there is extreme pressure on available land. As a result, cultivation has expanded onto marginal land, steep slopes, and forested areas, causing deforestation, land degradation, and soil erosion. Furthermore, climate change is producing greater intensity of rainfall, which exacerbates erosion. This erosion lowers the productivity of tea plantations, because it removes topsoil as a planting and nutritional medium, and soil deposited downstream on lower-lying plantations can significantly reduce tea yields by creating conditions for flooding and waterlogging.



Context

Tea is one of Rwanda's leading products, accounting for 13 percent of exports in 2016 (Observatory of Economic Complexity 2016a). The government launched a program in 2000 to increase tea production and earnings under which it privatized tea factories and associated plantations. The Shagasha factory in the mountains of southwestern Rwanda was among the last to be privatized, when two U.K.-based charities, TWFA and The Gatsby Charitable Foundation, acquired the majority shares in 2012.

Now, the Shagasha Tea Company processes tea grown by 4,500 smallholder farmers. Their production depends on soils, forests, biodiversity, carbon stocks, and water. The Shagasha factory and the plots of its supplier farmers are located near the dense forests of Nyungwe Forest National Park, an important reserve for threatened wildlife.

In line with the government's program to expand tea cultivation, TWFA and the Shagasha Tea Company aim to double their production, now 2 million kilograms of tea annually, or about 8 percent of Rwanda's production. This means increasing yields on lands already cultivated and expanding cultivation onto new land. It also means expanding the handling capacity of the Shagasha factory and sourcing more wood to feed boilers that generate heat needed in the tea production process. Meeting these goals—and understanding how they depend on and impact natural capital—was the impetus for TWFA to apply the Natural Capital Protocol at the Shagasha Tea Company in 2017.

Understanding the natural capital dependency issues

Land near the Shagasha factory potentially available for expanded tea cultivation is currently used to grow annual crops. Tea, as a perennial crop, retains soil more effectively than annual crops—this improves soil stability and reduces runoff and sedimentation. A technique to further reduce soil erosion is planting tea seedlings along contours that form small ridges on the hills, a version of terracing called contour planting.

Tea processed at the Shagasha factory is now grown on some 1,399 hectares of land. TWFA used the Protocol to analyze two options: converting annual crops to tea and using contour planting. The analysis also identified land close enough to grow tea for the Shagasha factory—the “tea shed.” Within that area, more than 28,000 hectares are planted with annual crops. Overlaying erosion and runoff data onto the tea shed revealed more than 13,000 hectares of annual cropland close to the Shagasha factory at greatest risk of erosion—which can be targeted for conversion to tea plantings.

Protocol application results show several benefits from the strategy of planting higher-yielding tea varieties using contour planting on slopes previously growing corn, a commonly grown annual crop.

Increase in smallholder incomes. When tea varieties are planted along contours on slopes previously growing corn, a smallholder's income increases by US\$1,260 per hectare annually.

Lower decline in tea yields caused by climate change.

Contour planting reduces the decline in tea yields expected because of the effects of climate change, which will produce greater rainfall intensity and therefore increased soil erosion. Without contour planting, in 40 years, the total annual yield from the existing planted area would fall from 9.8 million to 4 million kilograms; with contour planting, the drop would be to 8.7 million kilograms.

Less soil loss.

The conversion of upland annual crops to contour-planted tea significantly reduces soil loss. Financial losses to farmers with low-lying crops would be lowered to US\$182 per hectare annually on affected areas, a significant benefit of US\$510 per hectare annually. This change also benefits the Shagasha Tea Company, which would receive an additional 3,320 kilograms of green tea leaves per affected hectare annually. Furthermore, reduced soil runoff would result in lower chemical treatment costs for a downstream water treatment plant at Cyunyu, a US\$2,016 annual value. TWFA may apply this principle in other projects where the benefit may be significant and enable it to negotiate payments for ecosystem services (PES) from downstream stakeholders.

The analysis confirmed the critical importance of a sustainable supply of the eucalyptus wood used as fuel in the tea production process. Since little has been done in recent years to increase productivity and production volumes on Shagasha's eucalyptus plantations, the push to increase tea cultivation may result in fuelwood shortages. TWFA engaged The Gatsby Charitable Foundation in 2016 to advise on how to strengthen the fuelwood supply from Shagasha's 345 hectares of plantations, since half of the 6,000 cubic meters needed must be sourced from third parties. Gatsby concluded that the existing plantations could supply the full amount, with the use of improved forest management methods.

Results of the Protocol application and lessons learned

TWFA plans to communicate the lessons learned to farmers, to persuade more of its producers to invest in improved tea management, and to convince other smallholders of the benefits of tea cultivation and attract them into the supply chain. TWFA also can apply the new knowledge in its other East African tea projects, which work with and support 45,000 smallholders.

The lessons learned at Shagasha are relevant to other companies and countries. Because of TWFA's reputation as a socially concerned stakeholder in the Rwandan tea industry, two other companies approached the business to partner in establishing new tea plantations and factories: Luxmi, which produces teas in its home country of India, and Unilever, a British-Dutch multinational that owns Lipton Tea. Furthermore, TWFA's use of the Protocol may influence other companies to adopt natural resource considerations into their own decision-making—in the food and beverage industry, among impact investors, and in the wider financial sector.

CASE STUDY

Colombia: The country level diagnostic assessment

Introduction

Colombia's natural capital, representing an estimated 13 percent of its overall per-capita wealth (World Bank WAVES 2015), is essential for helping the country achieve sustainable growth and poverty-reduction objectives—particularly for smallholder farmers who depend on natural capital and the services it provides to support their agriculture-related activities.

While the country's economy has shown solid growth in the last 10 years, its National Development Plan notes that future growth might be unsustainable because it continues to deplete its natural capital (BBVA Microfinance Foundation 2015).

Colombia's coffee sector illustrates this challenge. Coffee is the country's third largest export (Observatory of Economic Complexity 2016b) and employs more than 540,000 people, most of them smallholder farmers. Globally, Colombia is among the top four coffee-producing countries (ICO 2020). In 2018, it accounted for 8.3 percent of the US\$30.1 billion global green (unroasted) coffee market (Observatory of Economic Complexity 2016c). Natural resources and ecosystem services that underpin coffee production include land, healthy soil, and a reliable water supply, as well as forest cover to stabilize soil and provide shade, pollination, and pest control. However, decades of unsustainable farming practices, expanded livestock grazing, and urbanization have put pressure on Colombia's coffee-growing terrain. Historically, expansion of coffee production has caused direct and indirect deforestation (Magrath and Ghazoul 2015), resulting in a loss in ecosystem services that coffee depends on. Going forward, climate change is expected to deliver disruptive changes in rainfall and to accelerate forest loss by shifting agriculture into forested areas.

In this context, in 2016, global coffee company Nespresso began to explore its dependencies and impacts on natural capital, deploying elements of the newly released Natural Capital Protocol to assess the cost-effectiveness of certain aspects of its coffee sustainability support program, which was designed to improve farm practices and coffee quality, with a focus on water resources management. Given the significance of the coffee industry in Colombia, this provides a demonstration case for other private-sector actors, highlighting both how a natural capital approach can be used by a business to deepen its sustainability, as well as the challenges that Nespresso experienced in applying the Protocol.



Application of the Protocol

Nespresso's assessment provided evidence of the benefits delivered by its sustainability program via the use of water-efficient technology: both water savings for farmers, and savings on money invested in the farms by Nespresso, especially during times of water scarcity (for more details, see the Colombia corporate application in Annex 1).

The assessment also concluded that a deeper understanding of water availability in times of water stress, and of solutions, will require a more comprehensive assessment that explores the dynamics of the surrounding landscape and watersheds in which coffee production occurs. Colombian policies and initiatives such as the World Bank Group-led Wealth Accounting and the Valuation of Ecosystem Services (WAVES) global partnership is supportive of this type of landscape-based approach. Starting in 2011, WAVES has helped Colombia compile natural capital "accounts" of water and forest resources, the contribution of these resources to its economy, and the impacts of its economy on these environmental resources.

The enabling environment for further uptake of natural capital approaches

Colombia's enabling environment is already supportive of accelerated action on the natural capital front. This environment includes the country's green-growth-oriented government policies and several conditions specific to the global agribusiness sector, for example; vulnerability to climate change, a consumer demand for sustainably grown products, sustainability certifications, and global green finance initiatives that push financial institutions to impose stronger environmental, social, and governance requirements.

As for local capacity, the Colombian private sector has a nascent understanding of natural capital dependencies and impacts, but limited ability to conduct the data analytics and valuation that is often needed to define paths forward. Regarding the fourth element, networks, the country's financial sector is active in sustainability—predominately concerning environmental risk management and opportunities involving green growth and climate—and this opens the door for natural capital. However, the financial sector is relatively young in its understanding of how natural capital can build upon sustainability efforts and how to integrate natural capital into portfolio-level assessments. Colombia has a robust and active civil society, and many of its NGOs manage important natural capital data, such as the Tremarctos geographic information platform.

There was an overwhelming desire on the part of Colombian stakeholders in the private, public, and financial sectors to assume leadership on sustainability and natural capital issues, by moving from strategy to execution. One need that emerged was for an organizational home to coordinate natural capital management, measurement, and valuation activities in the country so that they meet the needs of multiple stakeholders. Colombian organizations such as the national branch of the World Business Council for Sustainable Development (CECODES) and the National Business Association of Colombia (ANDI) could play this role. Networks like these could also help break down known barriers, by demonstrating the opportunities from measuring and managing natural capital sustainably, and by facilitating dialogue with government and other key players.

Going forward

Colombia—and other countries—needs more examples like Nespresso’s assessment of its sustainability program that demonstrate the usefulness of including environmental information in decision-making. Some Colombian stakeholders said that the main obstacle to this practice is lack of familiarity with the type of decisions that this information could inform, and the range of benefits that it could deliver. Also, the country’s existing policies and financial incentives for promoting sustainable environmental practices—such as those that encourage payments for ecosystem services (PES)—should be scaled up throughout the country and expanded by aligning public- and private-sector incentives for measuring, valuing, and managing natural capital. One example would be integrating PES in a landscape, with incentives for farmers to practice sustainable coffee farming.

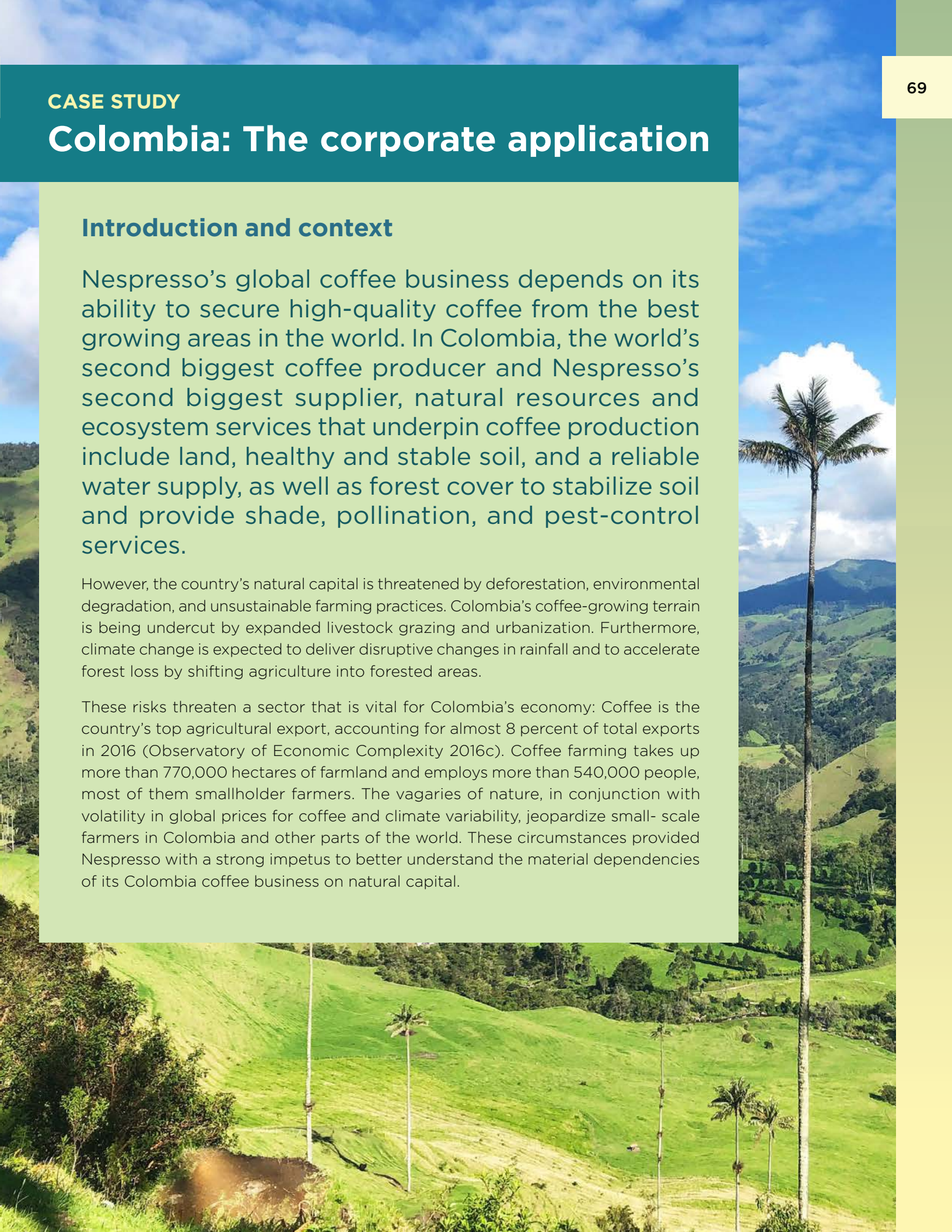


CASE STUDY**Colombia: The corporate application****Introduction and context**

Nespresso's global coffee business depends on its ability to secure high-quality coffee from the best growing areas in the world. In Colombia, the world's second biggest coffee producer and Nespresso's second biggest supplier, natural resources and ecosystem services that underpin coffee production include land, healthy and stable soil, and a reliable water supply, as well as forest cover to stabilize soil and provide shade, pollination, and pest-control services.

However, the country's natural capital is threatened by deforestation, environmental degradation, and unsustainable farming practices. Colombia's coffee-growing terrain is being undercut by expanded livestock grazing and urbanization. Furthermore, climate change is expected to deliver disruptive changes in rainfall and to accelerate forest loss by shifting agriculture into forested areas.

These risks threaten a sector that is vital for Colombia's economy: Coffee is the country's top agricultural export, accounting for almost 8 percent of total exports in 2016 (Observatory of Economic Complexity 2016c). Coffee farming takes up more than 770,000 hectares of farmland and employs more than 540,000 people, most of them smallholder farmers. The vagaries of nature, in conjunction with volatility in global prices for coffee and climate variability, jeopardize small-scale farmers in Colombia and other parts of the world. These circumstances provided Nespresso with a strong impetus to better understand the material dependencies of its Colombia coffee business on natural capital.



Understanding the natural capital dependency issues

The main initiative for securing Nespresso's sustainable coffee supply in Colombia is its AAA Sustainable Quality Program, designed with the non-profit Rainforest Alliance to improve farm practices and coffee quality. Farmers whose production and processing techniques meet Nespresso's standards receive premium prices for their coffee. Through 2015, its 13th year, more than 70,000 coffee farmers in 12 countries participated—including more than 40,000 in Colombia. Net income growth for these Colombian farmers has outstripped that of non-AAA farmers by 46 percent, according to CRECE, an independent research organization in Colombia.

While the AAA program was generating economic dividends for some of its coffee farmers in Colombia, Nespresso wanted to also understand whether the program was yielding additional benefits, particularly whether the investment was effective at preserving coffee farmers' livelihoods and stabilizing Nespresso's coffee supply chain. Also, was this program protecting the underlying health of the supporting natural capital?

In 2016, Nespresso decided to explore those big-picture questions in an innovative manner, through a natural capital lens. The company applied elements of the newly released Natural Capital Protocol to quantify two specific metrics where it had the most farm-level data related to the use of water-efficient "*tanque tina*" technology for milling coffee on AAA smallholder farms. To reflect environmental impact, Nespresso valued the water savings from using the *tanque tina* each year instead of the conventional milling process, using data collected by CRECE. To reflect social impact,

the company measured the return on investment, or net benefit, from using *tanque tina* instead of the traditional milling process. The latter was calculated using Nespresso's estimated costs of training farmers to use the technology.

This focus also offered to deliver actionable insights for Colombia, where water resource management is a national priority since water scarcity and flooding present significant risks to companies and communities. Colombian areas at particular risk from climate change impacts and land conversion include the coffee-growing Pacific coastal departments emerging from years of conflict following the recent peace agreement. Given this vulnerability, Nespresso assessed its AAA farms in two of these departments, Nariño and Cauca.



Results of the Protocol application and lessons learned

Nespresso lacked the intensive farm-level data needed for comprehensive natural capital valuation in Colombia. Despite incomplete information, its assessment was able to provide evidence of the benefits delivered by its AAA program through deployment of the *tanque tina* technology:

Water savings for the farmers: Water use on AAA farms was much lower than on non-AAA farms, by a range of 52-83 percent less consumption.

Notional returns on water-efficiency measures: The analysis suggested the existence of a range of savings on Nespresso-supported water-efficiency measures, from a few cents per dollar invested for farms facing little or no water scarcity, to almost US\$10 per dollar invested in a scenario where water scarcity is severe. El Niño conditions, such as those Colombia recently experienced, have created instances of such extreme water scarcity. This wide variance in notional returns suggest that there are opportunities for more careful targeting of water-efficiency measures that can be explored.

Going forward, Nespresso is now better prepared to assess its natural capital across different operational environments. The company will also explore ways that natural capital assessment efforts could inform its continuing quest to quantify sustainability investments across its global coffee supply chain.



CASE STUDY

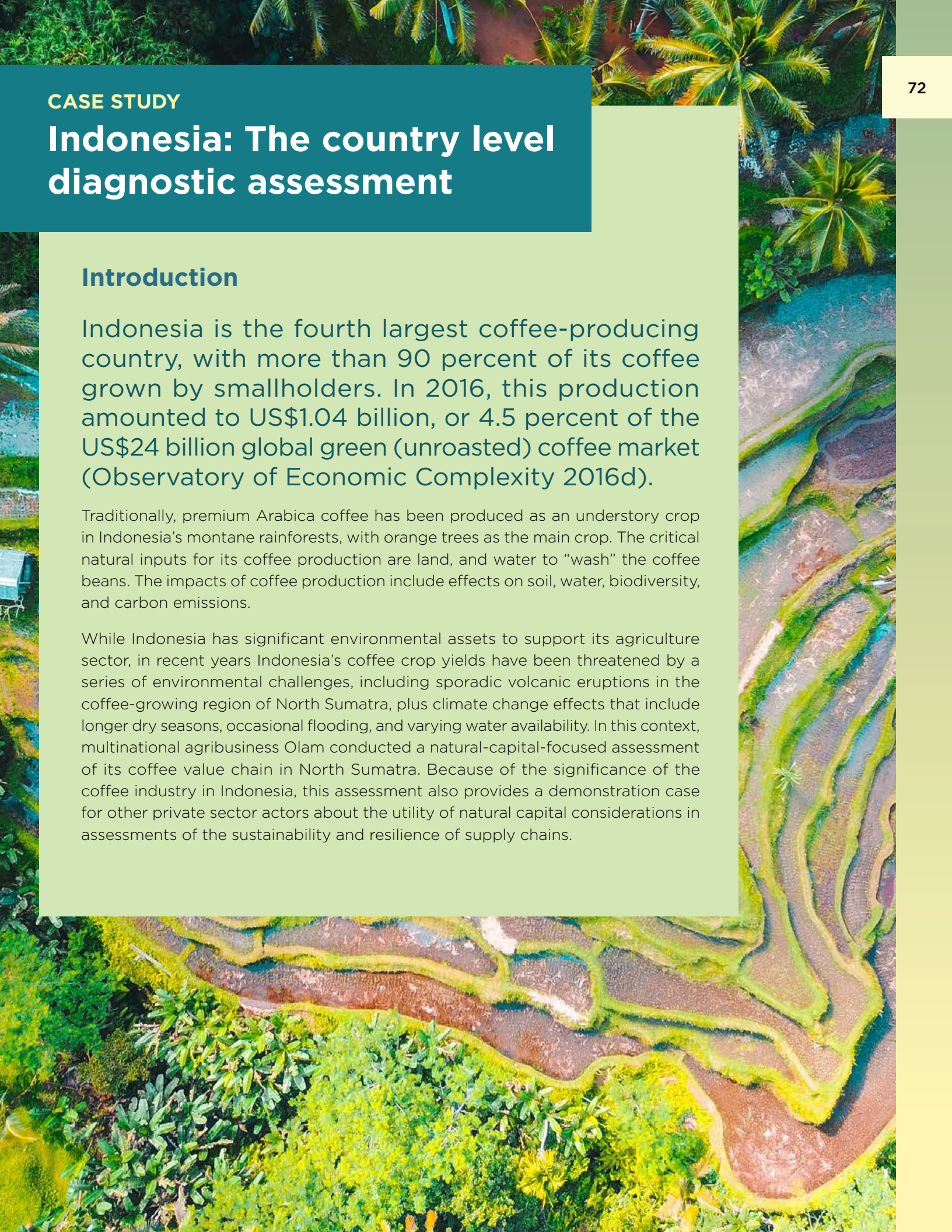
Indonesia: The country level diagnostic assessment

Introduction

Indonesia is the fourth largest coffee-producing country, with more than 90 percent of its coffee grown by smallholders. In 2016, this production amounted to US\$1.04 billion, or 4.5 percent of the US\$24 billion global green (unroasted) coffee market (Observatory of Economic Complexity 2016d).

Traditionally, premium Arabica coffee has been produced as an understory crop in Indonesia's montane rainforests, with orange trees as the main crop. The critical natural inputs for its coffee production are land, and water to "wash" the coffee beans. The impacts of coffee production include effects on soil, water, biodiversity, and carbon emissions.

While Indonesia has significant environmental assets to support its agriculture sector, in recent years Indonesia's coffee crop yields have been threatened by a series of environmental challenges, including sporadic volcanic eruptions in the coffee-growing region of North Sumatra, plus climate change effects that include longer dry seasons, occasional flooding, and varying water availability. In this context, multinational agribusiness Olam conducted a natural-capital-focused assessment of its coffee value chain in North Sumatra. Because of the significance of the coffee industry in Indonesia, this assessment also provides a demonstration case for other private sector actors about the utility of natural capital considerations in assessments of the sustainability and resilience of supply chains.



Application of the Protocol

Olam applied the Natural Capital Protocol to inform its decision-making and the design of more effective smallholder support programs, to strengthen farmer interest in growing coffee. The aim was to create programs to increase coffee yields and improve the resilience of smallholder livelihoods to environmental shocks, while simultaneously reducing impacts on the environment. Another goal was for Olam to incorporate natural capital considerations into its decision-making early on, to prepare for possible future regulatory changes and policy developments in Indonesia. The country has committed to pursuing the Sustainable Development Goals which integrate a consideration of natural capital.

Olam studied three natural capital factors that affect its coffee supply chain in North Sumatra—soil quality, water supply, and volcanic ash that damages coffee plants—and concluded that an agroforestry approach, combined with water and fertilizer management measures, could significantly boost production by smallholder farmers. (For more details, see the Indonesia corporate application in Annex 1.)

The enabling environment for further uptake of natural capital approaches

In 2020, agriculture accounts for about 14 percent of Indonesia's gross domestic product and 32 percent of its employment. However, agribusiness is highly vulnerable to climate variability, and unless Indonesia addresses the ongoing depletion of its natural capital, its future agricultural production is at risk. Future coffee production has been predicted to fall by 20 percent because of climate-related drought. The country has not yet fully integrated natural capital as an important driver of policies and sustainable financing initiatives.

The Indonesia Statistical Agency has been required to collect some environment data since 1997, under its System for Integrated Environmental and Economic Accounting (known as SISNERLING). However, practical use of data in relevant studies is still irregular, and the various tools to measure and value natural capital do not follow uniform standards. Furthermore, the existing discrepancies in awareness and effectiveness among the various levels of government lead to inconsistent enforcement of environmental laws, further challenging governance of natural capital across the Indonesian archipelago.

The private sector must play a key role in sustainably managing natural capital. There is no critical mass of local stakeholders to begin the process of integrating natural capital considerations into the agribusiness sector, mainly because of the generally weak business case so far for natural capital. The financial sector also can play an important role in motivating companies to adopt natural capital approaches. However, most Indonesian financial organizations have a short-term view

of risks that is mainly market related, whereas agribusinesses would benefit more from long-term financing that allows natural-capital-related costs and benefits to materialize. Also, the country's financial institutions require capacity building in adapting and applying sustainability guidelines.

Sustainable agribusiness platforms could scale up the use of natural capital identification, measurement, and valuation in Indonesia. International companies Olam, Unilever, and Nestlé have used the Natural Capital Protocol and cooperated with civil society and academia on these issues. Some Indonesian companies, such as Volcoffee, source certified and organic coffee and, although not measuring or valuing natural capital per se, are incorporating it into their sourcing decisions. However, smallholder farmers and small businesses have not yet been integrated at scale into these practices, and there is no organized network/platform for sharing existing relevant natural capital information.

Going forward

The private sector likely will have the greatest impact in promoting the wider adoption of natural capital approaches in the short term. Partnerships between retailers and agribusiness companies based on differentiating sustainable practices can improve market access and deliver price premiums. If the financial sector offers favorable terms to agribusinesses that demonstrate sustainability, that also may encourage the private sector to integrate natural capital into its decision-making. Meanwhile, the public sector can work to improve access to its data and to standardize its methodologies. Another crucial step for the government would be to strengthen and enforce sustainability guidelines for financing by Indonesia's Financial Services Authority.

Regarding a possible platform to support wider adoption of natural capital, the two existing organizations that could best incorporate natural capital into their practices and promote it to their members are Partnership for Indonesia Sustainable Agriculture (PISAgrO) and Sustainable Coffee Platform of Indonesia (SCOPI). Both have strong engagement with the private sector. PISAgrO, with members from throughout the agriculture sector, seeks to increase farm productivity and incomes and simultaneously decrease greenhouse gas emissions. SCOPI, which represents the private sector coffee industry and civil society, promotes public-private partnerships in coffee production and trade. International civil society champions of natural capital—such as the World Resources Institute, Sustainable Trade Initiative, and Conservation International—can provide means for other stakeholders to disseminate awareness, applications, and lessons learned about using natural capital in decision-making.

Olam may share its findings and impacts from its Natural Capital Protocol application with other companies, government agencies, the financial sector, and civil society involved in coffee and other forestry and agriculture value chains in the rest of North Sumatra. Stakeholders can explore common strategies for enhancing their shared dependencies and reducing negative impacts, which is crucial to grow the coffee sector and improve the livelihoods of rural communities.

CASE STUDY

Indonesia: The corporate application

Introduction

Multinational agribusiness Olam assessed three natural capital factors that it deemed material to one of its coffee supply chains in Indonesia—soil quality, water supply, and volcanic ash deposits that damage coffee plants. This assessment led to the identification of pathways to improve sustainability and strengthen resilience and smallholder livelihoods.

Olam established operations in the Indonesian province of North Sumatra in 2007, attracted by the favorable growing conditions, fertile soils, and potential for excellent coffee quality. The company sources coffee from a network of about 5,000 smallholder farmers. North Sumatra is famous for its agriculture, producing a range of plantation-grown products, including coffee. However, in recent years agricultural yields have been threatened by a series of environmental challenges and shocks: sporadic volcanic eruptions, plus climate change effects that include rising temperatures, longer dry seasons, flooding, and varying water availability, with accompanying outbreaks of pests and disease. In response, smallholders have been experimenting with different crops and combinations of crops as a means of building some resilience to increased environmental vulnerability. The role of coffee in smallholders' future plans is uncertain so finding ways to strengthen smallholder livelihoods around coffee growing is of great importance to Olam.

Context

Indonesia is the world's fourth largest coffee producer, with more than 90 percent of its coffee grown by smallholders. Traditionally, premium Arabica coffee was produced as an understory crop in the country's montane rainforests, with orange trees as the main crop. The critical inputs for coffee production are labor, land, fertilizers, and pesticides—plus water to “wash” the coffee beans. The main impacts of coffee production include effects on soil, water, forests, and biodiversity.

Olam has a strong presence in all coffee-growing regions of the world, where its supply chains link millions of coffee growers to roaster clients, before the beans are sold to retailers and consumers. Although coffee is currently a favored crop in Indonesia, Olam is exposed to the decisions that thousands of smallholder farmers make about which crops to grow, influenced in part by coffee's vulnerability to environmental degradation and level of profitability.



Understanding the natural capital dependency issues

Under Olam's various sustainability initiatives, its smallholder farmer suppliers are provided training, and local organizational structures allow them to pool resources for better prices, establish microcredit systems, and distribute inputs, such as fertilizer. A significant amount of the company's coffee is certified or verified through organizations such as Rainforest Alliance. However, these sustainability initiatives do not inform Olam about its dependence on natural capital or how different practices impact the natural capital base near its operations.

Given the various threats to its long-term coffee supply, Olam decided to deepen its understanding of natural capital impacts and dependencies, an approach it had piloted at other operating locations. In North Sumatra, Olam used elements of the approach detailed in the Natural Capital Protocol to analyze its coffee value chain and inform the design of more effective smallholder support programs to strengthen the farmers' interest in growing coffee. The intention was to enhance coffee yields and improve the resilience of smallholder livelihoods to environmental shocks and degradation, while simultaneously reducing impacts on the environment. Specifically, Olam examined these obstacles to coffee growing.

Degraded soil quality because of overapplication of inorganic fertilizers. Olam calculated the farmers' annual cashflows including input costs and revenue, based on the variables of coffee price and yields, comparing the current overapplication with two other more sustainable fertilizer regimes. The result: adopting a regime of semi-organic (mixed organic and inorganic) fertilizer improved soil-nutrient levels, boosted coffee yields by as much as 60 percent, and increased the resilience of farmers' net annual cashflows.

Accounting for climatic variability and volcanic shocks, smallholders' net annual cash flows increased by as much as 70 percent.

Insufficient water supply from a general lack of water collection infrastructure and reliable access to off-farm water sources during drought periods, exacerbated by climate change that is increasing the incidence of drought. Olam measured the impact of two changes: reduced water use (by repurposing water for a few cycles in the on-farm coffee washing processes), and increased storage of rainwater. The net result was greater availability of water, which both boosted coffee production and saved money for the farmers. The savings from not purchasing outside water allowed farmers' net annual incomes to rise by 5 percent under "normal" conditions, with no impact from environmental shocks, and up to 26 percent during droughts. Olam valued the water that was purchased by local farmers in order to replace naturally sourced water at US\$960,000 per year. This supports the notion of high returns on investments in water efficiency and collection measures.

Reduced pollination rates and damage to coffee plants because of periodic volcanic eruptions from nearby Mount Sinabung since 2010, when it violently erupted after lying dormant for more than 400 years. The most impacted smallholder farmers cited losses in yields from volcanic ash as high as 80 percent. Olam measured the potential impact of an agroforestry program that would use shade trees to shield coffee flowers from the ash and provide other environmental benefits. The company compared four production practices through a valuation approach. The two current practices were (1) intercropping coffee and chilies with no shade trees, and (2) intercropping coffee and orange trees, with the trees providing shade.

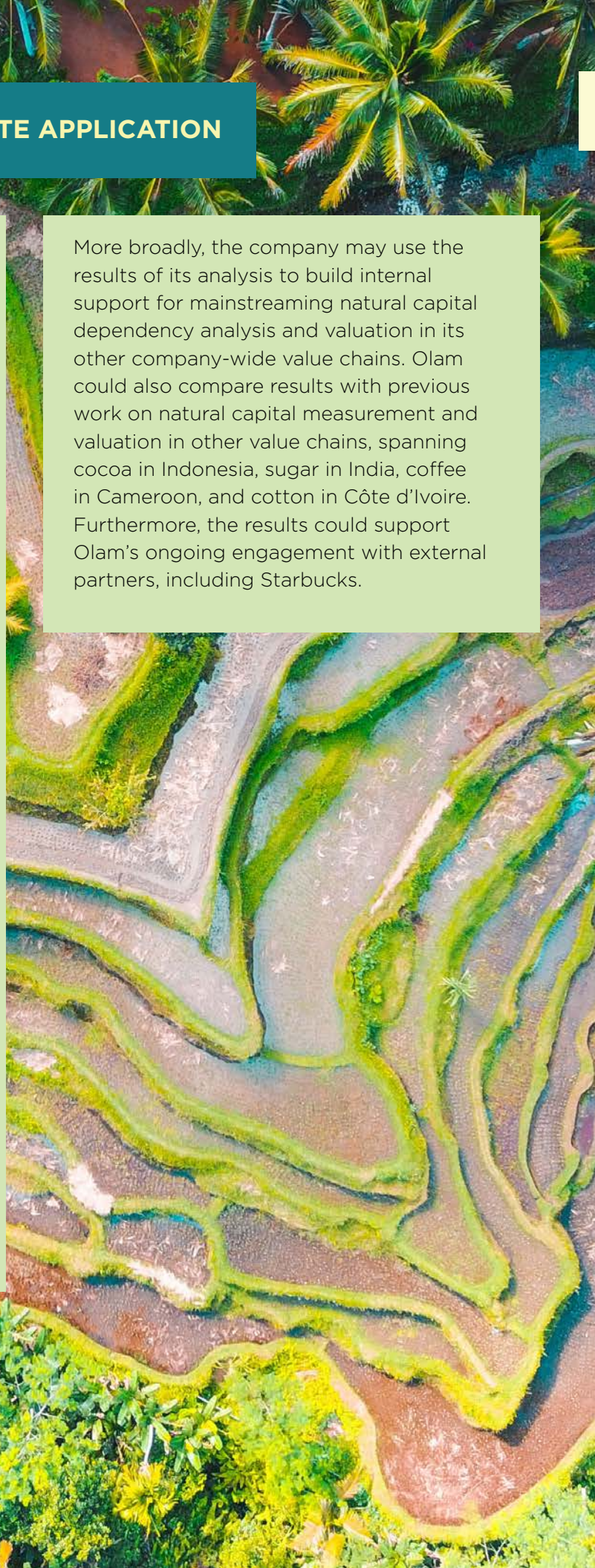
CASE STUDY: INDONESIA CORPORATE APPLICATION

Two agroforestry practices were proposed: growing coffee under Lamtoro shade trees and alongside either (3) vanilla bean or (4) black pepper, to provide short-term revenues while the trees reach maturity. Olam calculated the net annual cashflows for the four scenarios over 10 years. The result: under the two current practices, yields drop and reduce smallholders' mean net annual cashflow per hectare—from US\$5,000 to US\$3,700 for chilies, and from US\$5,000 to US\$1,500 for oranges. In comparison, under the two agroforestry practices, coffee yields increase by 45 percent and smallholders' net annual incomes grow by 38 percent, even accounting for climatic variability and volcanic shocks. Mean net annual cashflow per hectare surpasses the two current practices by year four, reaching US\$6,800 by year ten.

Results of the Protocol application and lessons learned

Olam can use the results of its assessment to improve its decision-making about its coffee supply chain in North Sumatra, and will apply the lessons learned by engaging with local farmers through outreach programs. Only 1,000 of the 5,000 farms in Olam's North Sumatra value chain are reportedly trained in Starbucks Coffee and Farming Equity (C.A.F.E.) practices to ensure coffee quality while promoting social, environmental, and economic standards. Olam's goal is to increase this number to 2,500.

More broadly, the company may use the results of its analysis to build internal support for mainstreaming natural capital dependency analysis and valuation in its other company-wide value chains. Olam could also compare results with previous work on natural capital measurement and valuation in other value chains, spanning cocoa in Indonesia, sugar in India, coffee in Cameroon, and cotton in Côte d'Ivoire. Furthermore, the results could support Olam's ongoing engagement with external partners, including Starbucks.



CASE STUDY

The Philippines: The country level diagnostic assessment

Introduction

The Philippines's natural capital is valued at 18 percent of its total per-capita wealth (World Bank 2018), significantly more than the average 3 percent for high-income OECD countries.

Tourism is a major industry in the Philippines, with direct contributions to GDP of over US\$30 billion, or 8.6 percent of GDP (World Bank TCDData360 2020a), and providing nearly one of every five jobs (World Bank TCDData360 2020b). In the globally famous destination of El Nido on the northern tip of the Philippines' Palawan island, tourism depends on natural resources including clean water, flourishing coral reefs, and unblemished views of Bacuit Bay. But the industry's tremendous success in attracting increasing numbers of tourists is at the same time threatening these resources. Furthermore, environmental stressors such as climate change also endanger the natural capital base.

In this context, island resorts and small tourism businesses in El Nido applied the Natural Capital Protocol to evaluate their dependencies and impacts on the environment of Bacuit Bay. Given the significance of the tourism industry in Palawan, this effort may also provide an opportunity to persuade the tourist sector elsewhere in the country to consider natural capital issues in decision-making.



CASE STUDY: THE PHILIPPINES COUNTRY ASSESSMENT

Application of the Protocol

The natural capital analysis showed that El Nido resorts, boat tour operators, dive companies, and fishers have a direct shared dependency on Bacuit Bay's natural capital. In addition, virtually all other tourism activities in the area (e.g., mainland accommodations and restaurants) and considerable government tax revenues are indirectly dependent on it.

An improved strategy for stewarding natural capital in Bacuit Bay should reflect this shared dependence, as well as differentiated impacts of businesses offering high-end and lower-end tourism. Recommendations stemming from the assessment were that El Nido's tourism industry and government should adopt a combined private-public approach to simultaneously retain and continue to expand the average length of stay for higher-revenue, lower-impact tourists; and reduce the effects of traditionally higher-impact tourists by setting caps and other means. (For details, see the Philippines corporate application in Annex 1.)

The enabling environment for further uptake of natural capital approaches

Integrating natural capital considerations, measurement, and valuation into the growth of tourism in Palawan hinges on a strong enabling environment. In the tourism sector, global pressure is an important driver for larger businesses to adopt more sustainable natural resource management practices and to disclose their use of and impacts on natural capital. However, this pressure will not affect small tourism businesses with limited international exposure. Furthermore, tourism in Palawan has not always led to inclusive growth. The rise of tourism in El Nido and an influx of foreign investment has created new jobs, some with

higher pay, but also created food insecurity given the mass conversion from agriculture and fishing to tourism occupations, together with a rise in food prices. In the financial sector, the central bank has indicated that it will stick with guidelines rather than mandates regarding sustainable financing. These signals do not yet provide the necessary impetus for the financial sector to mainstream incorporation of natural capital into its decisions.

Regarding the policy environment, overall, there is a strong body of laws and regulations that govern management of negative environmental impacts, both nationally and in Palawan. Among provinces, Palawan has led the way in many respects. However, enforcement is often lacking, and there are varying levels of capacity in local government. While the World Bank Group-led Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership has collected data on ecosystem services in southern Palawan, and various Philippine government agencies also collect data on natural capital, many of these data are relatively coarse or limited to a small number of samples. It can therefore be time consuming to aggregate and translate these various sources for an assessment at one company operating site.

Regarding capacity, for the most part smaller businesses do not have the time or resources to collect or use local data on natural capital to drive their decision-making. Natural capital measurement and valuation may be a familiar concept if reframed as environmental reporting and in terms of assessing damages and determining compensation; however, this is limited to evaluating natural capital impacts, not looking at dependencies.

Regarding networks, the tourism sector has a history of both collaboration and conflict between the private sector, government, communities, and NGOs in El Nido and other parts of Palawan.

CASE STUDY: THE PHILIPPINES COUNTRY ASSESSMENT

El Nido resorts, boat tour operators, and dive companies have implemented various sustainability initiatives, such as cleanup efforts, to protect the environment upon which they depend. However, they also rely heavily on the local government: to help manage the environment beyond Bacuit Bay's formally designated Marine Protected Area; plan the growth of the tourism industry; enforce regulations; and invest in basic infrastructure, such as wastewater treatment. In recent years, the government's role has been somewhat lacking, in particular given the rapid increase in visitors. Furthermore, many tourism stakeholders in El Nido have some level of distrust in government, because of corruption and a lack of transparency.

There are a number of organized platforms for sharing information and data related to natural capital in El Nido and Palawan, although the projects they are tied to have limited lifetimes. Capturing Coral Reef and Related Ecosystem Services, which trains people from government, businesses, and civil society in how to measure natural capital, has provided a platform for different stakeholders to interact and collaborate on the use of data related to marine environments. WAVES also provided an outlet for sharing information on natural capital, until its effort in the Philippines ended recently.

Going forward

Valuing the natural capital dependence of island resorts, island-hopping tour operators, and dive shops in Bacuit Bay illuminated their potential losses when those natural resources are degraded. The benefits and costs associated with different management scenarios can be used to help businesses, the public sector, the financial sector, and civil society to evaluate the mix of improvements in planning, regulations and enforcement, infrastructure, education, and rehabilitation efforts needed going forward. Furthermore, the case may be used as an example for other tourism destinations in the Philippines facing similar natural capital challenges.



CASE STUDY

The Philippines: The corporate application

Introduction

Resorts and small tourism businesses that operate in the globally famous destination of El Nido on Palawan island in the Philippines analyzed the natural capital issues associated with the sustainable tourism that they offer. The assessment revealed that they have a shared dependency on marine biodiversity and other resources, which must be reflected in any strategy for stewarding natural capital in the area.

El Nido is known for white-sand beaches, coral reefs, and as the gateway to the Bacuit archipelago of islands. However, various manmade factors have caused declines in water quality, coral cover, and fish populations in Bacuit Bay, including damage from anchoring of boats, trampling of coral by tourists, sedimentation, overfishing, and insufficient waste management. Climate change also threatens coral reefs and other parts of the natural capital base. Furthermore, based on trends from the last five years during which tourist arrivals grew by 30 percent annually, tourist numbers could double in the next five years, far exceeding Bacuits Bay's carrying capacity.

Context

Tourism is one of the Philippines's leading industries, with direct contributions to GDP of over US\$30 billion, or 8.6 percent of GDP (World Bank TCDData360 2020a), providing nearly one of every five jobs (World Bank TCDData360 2020b). The industry in El Nido spans tour operators, boat operators, dive shops, restaurants, accommodations, market vendors, and transportation. Ten Knots, which does business in Palawan as El Nido Resorts, operates eight luxury island resorts that collectively are the town's largest tourism business. These resorts market nature-based tourism with clean water, flourishing coral reefs, and unblemished views. They also depend on access to high-quality produce, fish and meats, electricity, and other natural resource-based inputs. El Nido tourism activities can affect the environment in many ways, including water pollution (both sanitary sewage and runoff), solid waste, and direct impacts on ecosystems, such as vegetation cut to build resorts.

Resorts and small tourism businesses in El Nido applied the Natural Capital Protocol to evaluate their dependencies and impacts on Bacuit Bay. Nearby fishers and agricultural enterprises also depend on natural capital in the bay, and stand to benefit from improved management of coastal resources.

CASE STUDY: THE PHILIPPINES CORPORATE APPLICATION

Understanding the natural capital dependency issues

The natural capital study sought to assess what actions the small tourism enterprises could take to best manage natural resources in order to optimize long-term financial benefits for themselves and broader societal benefits for other stakeholders. The study also examined associated impacts of improved natural capital management on the region's economy and on government tax revenues.

The assessment covered a “ridge-to-reef” system comprising the inland watershed, coastline, and offshore islands and coral reefs. The natural capital base was measured by three key indicators: coral reef cover, water quality, and fish populations. The assessment examined three scenarios for natural capital management in Bacuit Bay: “business as usual”, including no centralized sewage treatment; “existing improvement plans” for the near future that include installing a sewage treatment plant and capping access to sensitive, frequently-visited sites; and an “enhanced improvement plan” that includes rehabilitating reefs, improving both regulations and their enforcement to protect the bay's formally designated Marine Protected Areas, and raising fees for visiting tourists.

The analysis demonstrated a strong business case for improving stewardship of natural capital in Bacuit Bay: Coral reef cover, water quality, and fish populations can be improved while strengthening the profitability of all key stakeholders. Based on similar cases elsewhere, tourist arrivals would continue to grow exponentially until 2025, and then drop off sharply because of continued environmental degradation. Specifically, under the business-as-usual scenario, the tourism industry could experience US\$30 million in lost profits in the next 20 years when compared with the “planned management” scenario.

Furthermore, business as usual could trigger temporary shutdowns of local tourism, which could bankrupt many of the small operators. (The Philippine government closed Boracay, another major coastal tourism destination, for six months in 2018 because of heavy degradation caused by similar stresses as in El Nido). In contrast, actions under the enhanced management scenario could bring in an additional US\$42 million in revenues over the same period of time, compared with the “planned management” scenario.

The benefits of improved management extend beyond tourism. Under the enhanced management scenario, fishers stand to gain US\$17 million in improved fisheries productivity when compared with the “planned management” scenario, and they stand to lose US\$11 million if continuing the business-as-usual trajectory. As for tax revenues, the net present value of revenues collected as corporate income tax would be US\$60 million under the enhanced management scenario, compared with US\$52 million under “planned management” and US\$46 million under “business as usual”. The management approach ultimately implemented is in the hands of the local municipality and national government.

Results of the Protocol application and lessons learnt

The natural capital analysis showed that El Nido resorts, boat tour operators, dive companies, and fishers have a direct shared dependency on Bacuit Bay's natural capital. In addition, virtually all other tourism activities in the area and considerable government tax revenues are indirectly dependent on it. An improved strategy for stewarding natural capital in Bacuit Bay to avoid uncontrolled tourism growth and mitigate climate change impacts should reflect this shared dependence. The new management strategy should also differentiate between impacts of businesses offering high-end and lower-end tourism. Recommendations stemming from the assessment were that El Nido's tourism industry and government should adopt a combined private-public approach, with two goals:

- retain and continue to expand the average length of stay for higher-revenue, lower-impact tourists; and
- reduce the effects of traditionally higher-impact tourists by setting caps and improving both regulations and their enforcement governing boat operators and tourist conduct in the bay's formally designated Marine Protected Areas. For example, tour operators can reduce boat anchoring to limit marine damage, and better educate tourists about how to minimize coral trampling.

While strong precedents have been set for natural capital accounting in Palawan, adoption of natural capital measurement and valuation is still nascent in the Philippines's private sector. Data and information coverage and availability are still primarily limited to natural capital impacts rather than dependencies, and the information is mostly collected by larger tourism companies. Notwithstanding, natural capital measurement will grow in usefulness for the private sector going forward, given the major vulnerabilities of the tourism industry to climate change.



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