

Valuing Natural Capital

Solutions for a sustainable future

November 2023







Background

In September 2022, the Geneva Macro Labs have been organising together with its partners, key researchers of Harvard Economics Department, the International Labour Organisation the United Nations Institute for Training and Research (UNITAR), and the UNCDF, the "Valuing Natural Capital" conference (VNC2022) and several trainings in this context. The focus of the conference has been to explore different natural carbon sinks and the contribution they can make to help address climate change. VNC2022 is a call for action to promote tangible, impactful, scalable solutions to climate change by connecting climate and finance. This Solutions Paper is the summary of our discussions with ideas of how to implement new approaches for the preservation of our natural environment.

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How to value natural capital for its preservation

Slowing and ideally stopping climate change has become the defining feature of our times. Disagreement ensues not regarding the objective but rather how to achieve it. Radical solutions to completely change our way of life clash with techno-optimistic proposals to engineer our climate. So far, none of the approaches taken have managed to substantially lower global CO₂ emissions. Our current way of life is threatening to significantly overshoot the target to reduce CO₂ emissions to the level of natural and other CO₂ absorption ("net-zero") by 2050. Much effort is currently being deployed to reduce our emissions to help keep the carbon budget within its limits. This won't be enough, however. We need also to look to the other side of the equation: Enhancing the planet's capacity to absorb carbon dioxide from the atmosphere and to sequester it needs to become a key building brick in the global strategy to fight climate change. Our biosphere already does an amazing job at extracting atmospheric about half of the emitted CO₂ and burying it in trees, mangroves, seagrass and the oceans, to name but a few. These and other nature-based solutions for carbon sinks play an essential role in regulating the climate. But they are threatened by rising temperatures and human interventions in eco-systems.

Simple conservation efforts often collide with local development goals or are undermined by a lack of financing that threatens the economic viability of many such projects. Various governance mechanisms have been tested, often financed through philanthropic efforts. But natural reserves or maritime protected areas fail to make a significant dent in preventing the deterioration of the protected eco-systems and fail to scale up.

A new paradigm is needed, one that recognises how essential the services are that nature delivers to regulate the climate and to preserve a diverse and thriving biosphere. The ecological value of these services is straightforward, but they can also be measured in economic terms: Global Warming could cut global GDP by 11-18% by 2050 according to a study by Swiss RE [1]. Preserving and restoring nature means recognising the importance of the services delivered by the environment to our own survival. And a thriving biosphere delivers a value that is currently not properly reflected in our way of life. Valuing natural capital, therefore, is accounting for the damage we do to the environment and ultimately to ourselves.

Setting the stage for nature-based solutions, this Solutions Paper presents the different issues and solutions that had been discussed during an event organised by the Geneva Macro Labs in September 2022. It provides an overview of various governance mechanisms to protect ecosystems, describing their mechanisms, effectiveness, and shortfalls in protecting the underlying natural asset, whether an individual (keystone) species or an entire ecosystem. It also discusses the potential of current governance mechanisms to support economic livelihoods for populations living with or in close vicinity to the ecosystem in question.

Our speakers have looked into alternative, innovative financial mechanisms to provide the protection of natural assets, which we will present in this Solutions paper. Setting out the logic of turning natural assets into natural capital by valuing their ecological and economic services, the paper discusses how both decentralised financial operations and government-led efforts help strengthen incentives for eco-system maintenance and restoration. At the one, innovative end, these proposals include digital tokens of individual eco-system services.



On the other, more traditional approaches include debt-for-nature swaps and green bonds. The Solutions paper highlights the importance of finding solutions by which such financial mechanisms can address the challenge of international collaboration and cooperation as a key impediment to current efforts to design and implement effective climate change policies.

The Solutions paper introduces the concept of “Triple Wins”, for mitigation, for adaptation and for development. Importantly, it offers various perspectives of how protecting natural capital can become a driver of local economic development, support just transitions to a green economy and provide new resources for an innovative and dynamic economic system. Identifying the important positive feedback loops between safeguarding ecological systems and providing broad-based economic development and livelihoods has been an important part of the conference discussions.

Finally, we present a pathway towards valuing natural capital that summarises our speakers' ideas and provides a possible agenda for change. A brief overview is presented at the beginning of this Solutions Paper. We hope that our approach can instigate the necessary transformation towards a truly sustainable way of life.

Natural capital for the common good

Natural capital refers to the fact that our biosphere delivers essential services to our own survival, be it in the form of regulating the climate or generating biodiversity that allows us to feed, heal or simply enjoy nature. Similar to other forms of capital – land, machines, buildings – natural capital needs to be preserved in order to be able to deliver these services. Exploiting it for other uses, for instance by cutting down trees to generate timber or hunting elephants for their tusk without regenerating what has been extracted will destroy not only nature but also the essential services it delivers. Currently, however, our economic system has relied to a large extent on extracting value from the biosphere without renewing it, significantly contributing to worsening climate change.

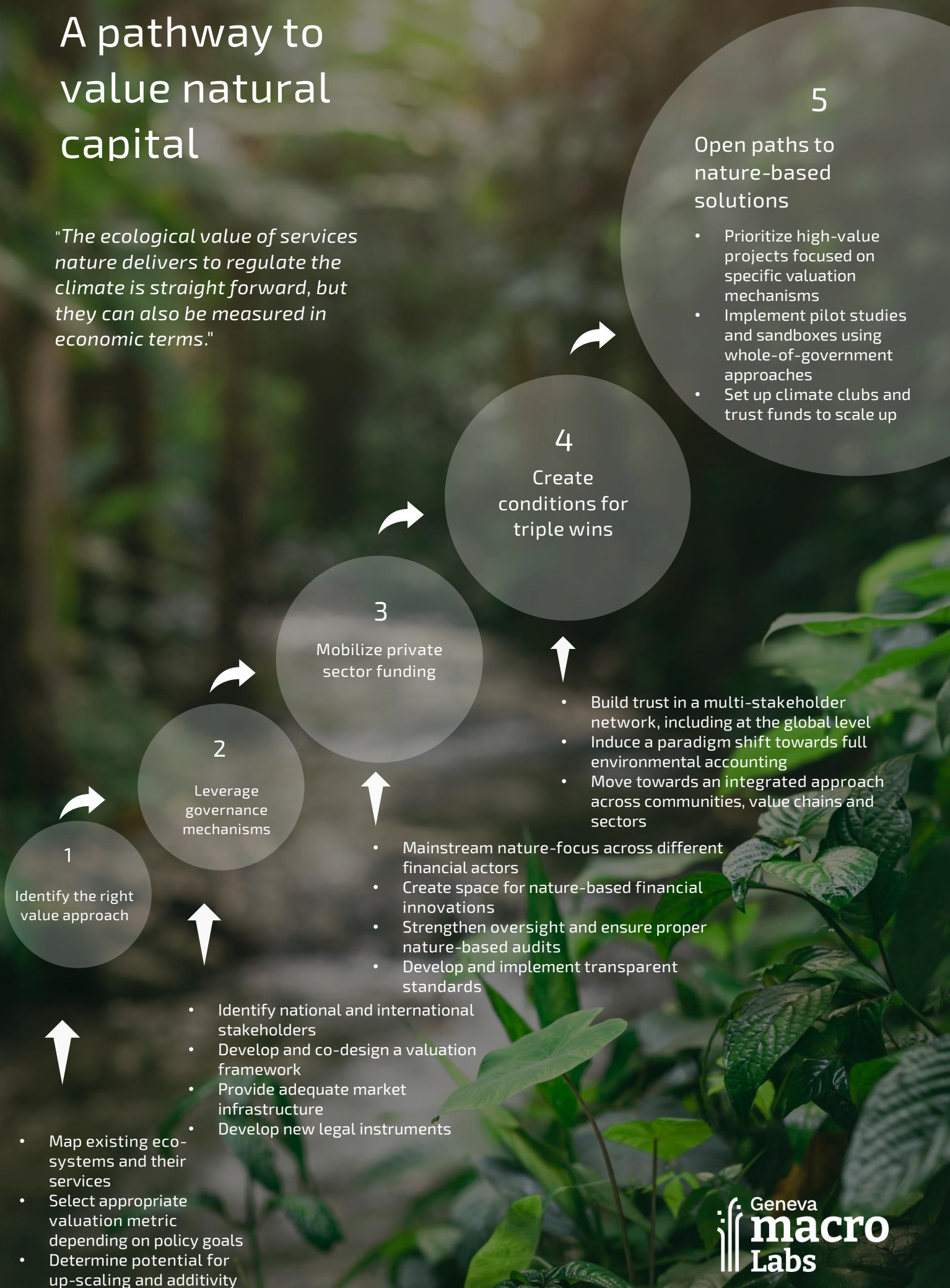
Ecological and economic services to be preserved

At a minimum, therefore, further erosion of the existing stock of natural capital should be prevented to preserve the carbon dioxide currently stored in the biosphere. Recent estimates call for the conservation of at least 30 percent of the earth' surface over the next decade, nearly a doubling of current efforts. How to achieve these and where to deploy the most effective conservation efforts remain matter of debate. Yet the benefits in terms of both slowing global warming and improving livelihoods can be significant. Reverting deforestation to allow forests to regrow alone could contribute to 4 to 12 percent of the annual CO₂ emissions budget needed to limit global warming to 1.5 degrees. Similarly, job creation through conservation management could add around half a million jobs and support local economic growth. [2]

None of these efforts might be enough in and of themselves. Indeed, it will be important to identify which species and eco-systems contribute which services and how valuable these services are to us. Nevertheless, natural capital can only complement our efforts for reducing carbon emissions, and not be a substitute for it. [3]

A pathway to value natural capital

"The ecological value of services nature delivers to regulate the climate is straight forward, but they can also be measured in economic terms."





1 The value approach

What is Natural Capital? Some examples

Amazonian rainforest

The Amazon rainforest stretches across nine South American countries and covers 6.7 million km², making it the world's largest forest and one-third of the world's tropical rainforests. There are more than 40,000 species of plants, 427 mammals, 1,294 birds, 378 reptiles, 427 amphibians and about 3,000 species of fish, making up 10 per cent of the known species on our planet. Indeed, there are 200 to 300 species of trees per hectare in the Amazon rainforest, compared to only fifteen or so in the temperate forests of Europe, hence its nickname of "world biological reserve". A key benefit of the variety and density of plants in the Amazon basin arises from its capacity to store approximately 100 billion metric tons of carbon, more than ten times the annual global emissions from fossil fuels. This ecological contribution is essential for the planet.

Nevertheless, the Amazon rainforest is threatened by deforestation brought about by extensive agriculture and timber production. Thanks to the significant profits it generates, countries such as Brazil specialized in the primary sector to become an agricultural power. Since the 1990s, Brazilian agricultural production has doubled, and animal production has tripled. In 2015, agricultural products accounted for 42% of Brazilian exports, that is more than 5% of total agricultural exports worldwide. As a result, between 1978 and 1988 the average deforestation area was 20,000 km² per year, in the early 1990s it dropped to 15,000 km² per year before increasing considerably to reach a cleared area



of 29,000 km² in 1995. After this record, there was a decrease in deforested areas. But deforestation resumed in 2001-2002, peaked in 2004 and only very recently seems to considerably slow down [4].

As deforestation continues, the capacity of the Amazon rainforest to absorb CO₂ has declined significantly. Together with global warming and various forest fires, the Amazon rainforest is estimated by a study to partly emit more CO₂ than it absorbs. [5]



Great Whales

Individual keystone species such as Great Whales are also a significant contributor to eco-system stability and provide important ecological services. Whales produce at least three ecological services that can be valued: carbon capture, fisheries enhancement but also ecotourism. Their capacity for carbon capture alone constitutes a significant economic and ecological value. Indeed, each animal is estimated to roughly sequester up to 33 tons of CO₂, on average over its lifetime, which, when it dies, sinks to the ocean floor and remains sequestered there. This means, over the course of its life, the whale captures the equivalent of USD 2 million worth of carbon. In addition, whales also contribute greatly to regulating phytoplankton via the food chain krill-whales-phytoplankton-krill.[6] Thus, the activity of whales contributes to increasing the productivity of phytoplankton, which can be estimated to capture yet another 37 billion tons of CO₂ per year. Overall, their contribution to the ecosystem per year could be equal to the GDP of the countries between Greece and Bulgaria and it evolves according to the market prices of carbon emissions. [7]



Despite the economic and ecological value of great whales, their population is threatened by human activities such as entanglements in commercial fishing gear, ship strikes and climate change that leads to rising ocean temperatures. Commercial whaling, once a key danger to their population has, fortunately, declined significantly but continues to subside in protected sanctuaries despite an international ban. Overall, this has led to a significant reduction in the number of whales. Indeed, the whale population before human activities was equivalent to about 4 to 5 million. Now, the total number of whales is barely more than 1.3 million and is only slowly and partially recovering despite the protection in place. This is limiting the services provided by the mammal.

Sea grass

Seagrass is a plant found in shallow salt water, actively shaping undersea landscapes, and providing shelter for water animals, thereby benefiting the maritime ecology. It is fundamental to the biodiversity within the ocean as one meter square of seagrass is estimated to be able to generate 10 litres of oxygen, capture sand, dirt, and other silt particles. Additionally, the carbon emission present in the air is used by seagrass beds to build their leaves, resulting in an estimated 83 million metric ton of carbon that is captured by seagrasses yearly. This represents a significant economic value as one hectare of seagrass is estimated to be worth over USD 19,000 per year, being the third most valuable ecosystem in the planet. [8]



These ecological benefits have a direct impact on the biodiversity of the ocean, as they are part of the food system for many species in the water, thus also having long-lasting economic impact on maritime markets. Nonetheless, human's impact has been proven by the yearly 1.5% lost in this system, due to a combination of factors such as fertilizers or air pollution that block the needed sunlight for seagrass growth. Furthermore, the frequent removal of fish and use of boat anchors have been shown to have a direct casual effect on the health of seagrass beds. Limited attempts to restore seagrass through "underwater gardening" have been tried in the UK but remain too small to this day. Globally, the decline of seagrasses in area accounts for a loss of roughly 29% since the beginning of the 20th century. [9]



Mangroves

Mangroves are a type of tropical forest known for its great resistance and ability to thrive in hot, muddy and salty environments. They are being regarded as one of the most valuable systems found in nature, providing great ecological benefits not only in terms of capturing carbon emissions. For example, their ability to provide detritus, found within the fallen leaves and branches of mangroves, provides several habitats to animals such as birds or reptiles. The benefit of this system is best exemplified by their ability to adapt to saline environments, by filtering the salt from the water, or to low levels of oxygen. The biggest benefit mangroves provide stems from their capturing of carbon dioxide amounting between 50 and 220 metric tons per acre of CO₂ during their growth period.



Moreover, they provide economic benefits of up to USD 57,000 per hectare per year to the national economies of developing countries with mangroves. Nevertheless, human activity has been highly damaging to mangroves, contributing to a loss of about a quarter of mangroves in the past 40 years. Several investigations into mangrove restoration projects have brought to light key problems linked to a lack of scientific research behind the restoration process. [10]



Elephants

Elephants, such as the African forest elephant, provide essential eco-services to the forests they live in, such as through their dispersal of seeds, especially those from trees that have a high carbon content. Wherever forest elephants roam, therefore, they promote the growth of larger, taller trees. These trees—which biologists call late-succession trees—store more carbon in their biomass than the trees that would have grown in their place. All trees capture carbon in their tissue—the equivalent of about 50 pounds a year, on average—but because of the greater size and height of late-succession trees, there is simply more tree biomass capturing more carbon in these trees than in those that would have grown and dominated the rainforest canopy. Forest elephants thus actually increase the amount of carbon stored by the rainforest by tilting the biological balance in favor of certain types of trees. [11] With a current population of forest elephants estimated at 400,000 animals, this amounts to an ecological wealth at the tune of USD 680 Billion.[12]

Despite the ecological benefits brought by elephants, their survival is threatened by human activities, including hunting them for their tusk or through indirect effects from extensive agriculture. Global warming further deteriorates the habitat of elephants, for instance through a rise in the global sea levels. This directly affects elephants found along coastal areas as they will have to swim longer distances to survive or live in submerged habitats. Not only does this limit the ecological benefits of the African forest elephant. It also prevents some of the poorest countries in the world from valuing their natural services properly. Just by preserving its current population of elephants and valuing their eco-services, a country such as the Democratic Republic of Congo could add almost USD 1 500 to its current per capita income, a 250% increase that would come to the benefit of those populations that act as stewards of eco-system protection. Nonetheless, the solutions proposed to help their preservations fell short as many countries, have rejected the idea of fully banning ivory trade, due to short-term economic benefits. In fact, despite the 1989 vote to ban completely ivory trading, some countries have argued to reinstate limited trading in areas that have seen significant elephant growth in the past decades.





Solution Step 1: Identify the right value approach

To value nature, the right approach needs to be identified first. Accurately appraising the contribution of natural capital and ecosystem services is imperative to more informed decision making. Moreover, effective valuation ties in all actors to determine which methods and which trade-offs are the most suited to assessing nature. Four major methods have been identified, depending on the type of eco-system contributions that are considered, the actors involved, and the information required. [10]

Nature-based valuations

Nature-based valuations gather and analyse observations of biophysical properties of nature with the aim to inform decision-making on nature. These include observation on species, ecosystem structures and processes, but also landscape, topography, soil, water and air [13, p. 154]. These biophysical properties will then be assessed against the value of human activities to provide the same or a similar eco-system service. This means that a certain value to humans is created by an ecosystem, which can be monetized through a human demand for that ecosystem service. In other words, valuation is based on “the flows from ecosystems to socio-economic systems that are actually realised or used in a specific area and time”. [13] An example of this would be the water purification provided by a wetland.

Nature based valuations are easy to quantify, as there is a direct measurement of a feature of an ecosystem. Furthermore, many tools and methods have already been developed in this field, making this approach widely applicable. It also allows to measure natural values such as biodiversity, which economic tools usually don't unless there is a direct economic value created. The main disadvantage is that these methods don't consider non-use values, such as cultural values. Furthermore, even though inclusive methods exist, usually nature-based valuations don't include local stakeholders in their evaluation. Sometimes it can be difficult to come up with accurate measures: For instance, it might be difficult to accurately monitor the exact whale population in an area without making additional assumptions about migration patterns, etc.



Statement-Based valuations

Statement-based valuations directly ask people to express their values. [13, p. 158]. This can be done in a highly structured, collecting a fixed set of value descriptors or unstructured way, collecting interests in ways that are not pre-defined. Data can be either elicited from individuals or from groups of people. This type of valuation can also help in assessing biophysical data, collected from a certain environment, or by establishing a willingness to pay (WTP) of participants. Individual and group/discussion-based methods are the two main types of statement-based methods. The former includes methods such as mental mapping, choice experiments as well as contingent valuation, while the latter include methods such as public good games, deliberative valuations and focus groups.

Statement-based method allows to elicit non-use values or more abstract values, where there is an absence of a markets, such as quality of life, cultural values or sense of place. It also engages stakeholders and is procedurally just and socially sustainable, by encompassing all affected actors. Through its inclusive nature it also creates greater acceptance by the affected parties, as well as facilitating deliberation between them. On the downside, these methods require significant resources, growing exponentially with the number of stakeholders involved. Furthermore, participants have an incentive to over- or understate certain preferences in order to influence policy. These types of methods are also highly dependent on the methods design, as well or badly structured methods can also influence actors.

Behaviour Based/Revealed Preference Valuation

A third approach to value nature is follows people's behaviour, known as revealed preferences valuation. "Behaviour-based valuation methods quantify or qualify the value of nature's contributions based on observations of people's behaviour using both economic and non-economic indicators". [13, p. 163]. This type of valuation lets people put their money where their mouth is, looking at the way they spend their time or money, such as qualifying the value of a national park through the number of yearly visitors and their willingness to pay for entry fees, travel costs to natural reserves or measuring the amount of money spent of defending them, such as for avalanche control or to prevent wild fires.

Revealed preference valuation can either be done directly by estimating values based on observed behaviour of consumers or indirectly by assessing "values based on a relationship between nature and individuals' behaviour observed through transactions in a linked market or reflected in some measures of costs". [13, p. 164] This method is useful, as it can capture non-market values, such as recreational value, without opening itself up to biases, such as statement-based methods might do. They allow insight into the actual choices and behaviours providing insights into how people value and use natural resources in real-world settings. This can lead to more accurate and contextually relevant valuations. However, revealed preference valuations require assumptions about the relationships of behaviour and natural valuation, which need a firmly established conceptual and empirical understanding. Furthermore, it is limited to observable behaviour and the collection of some types of data might be difficult.



Integrated Valuation

Bringing different valuation approaches together, “integration [valuation] involves a process or framework that synthesises different types of information with the overall purpose to generate a more comprehensive understanding of values at stake in a given policy context”. [13, p. 166] This can (and often does) take place implicitly through the inclusion of different methods or explicitly through formalised procedures and methods. One of the main purposes of integrated valuation is to aid the decision-making process in combining diverse values and stakeholders. This method can be further divided into Integrative methods in the aggregation of values and decision-making tools, which are primarily designed to inform decisions. In designing a method to integrate complex valuation methods in a representative and holistic way, there is a trade-off between comprehensiveness and ease of application.

Using an integrated approach, allows supplementing different methods with each other, adding information where one method fails to provide it. The problem is that these methods take up a lot of resources, the more holistic the approach the more expensive the research will be. It can also be hard to align different value dimensions, an ecosystem can have a clear monetary value, while a statement-based valuation might only result in a ranking of different types of ecosystem values.

Trade-offs and additivity

Each method comes with its own opportunities and challenges, requiring policy makers to identify the right method depending on eco-system characteristics and policy objectives. For instance, one can put a higher emphasis on social than on ecological values and vice versa. To help assess the various trade-offs involved, the “3R framework” can help, balancing the valuation against the three factors Relevance, Robustness and Resources. To assess a method's Relevance, decision makers need to ask how well the method applies to a wide range of values and how well it applies to a wide range of contexts. It is also important to think about how Robust a method's Evidence is, i.e., how accurate and reliable the data produced is, as well as considering if there is a fair representation of diverse stakeholders. Finally, policy makers need to assess the different methods against their Resources constraints to afford in setting up a valuation.

Typically, it is difficult to set up a decision-making context that i) provides all relevant information from all relevant stakeholders, ii) brings forward robust information on all important aspects of the alternative options, while iii) doing so using very few resources.” [13, p. 206] As mentioned with integrated valuation there is often a direct trade-off between resources and robustness, the more data a method includes or the higher the effort to ensure your hypothesis are met are, the higher the amount of money, expertise and time invested. The trade-off between robustness and relevance is especially salient for the process of scaling up valuation projects. Scaling up is an important consideration, as leads to a more standardized process and enables higher comparability. The problem is as systems become more standardized (i.e., more Relevant), they lose their ability to adapt to local circumstances and risk becoming less robust.

Additivity is a key requirement in threefold ways: First, nature is already absorbing around 50% of human emitted CO₂. There is a risk that existing carbon intake is labelled as additional. This could lead to huge financial windfalls, changing almost nothing and only reaching net-zero on paper. Second, carbon intake might be counted twice. For example, countries as well as private actors might count the same carbon sequestration, also leading to a false net-zero. Third, carbon intake might be small in the beginning. Particularly trees grow slowly, and premature estimation could overestimate carbon sequestration. Studies have estimated that 90% of carbon credits granted to rainforest projects do not substantiate [14].



Top Quotes by VNC 2022 Speakers, related to Solution Step 1

We are actively undermining the path to net zero by only focusing on the emissions side: the faster we lose ecosystems with their powerful sequestration benefits, the deeper of a transition we need across energy, transportation and all of the other emitting sector.

Jessica Smith

The Congo Basin forests, including those in Gabon, are crucial in the fight against climate change. These forests store nearly 10 years' worth of global carbon dioxide emissions and contribute significantly to stabilizing weather patterns and providing water resources for various regions, including the Sahel and Ethiopian highlands.

Lee White

The ocean's capacity to act as a carbon sink through various ecosystems such as seagrass, mangroves, and coral reefs is a crucial component in the fight against climate change.

Martin Koehring

What we need now is a transformative challenge to address the global biodiversity crisis and shifting away from values that overemphasize so short term and individual material gains to nurturing sustainability aligned value across society.

Nathalie Hilmi



2

Alternative Governance Mechanisms

How can natural capital be preserved? Alternative Governance Mechanisms



Various governance mechanisms have already been put in place to conserve and restore ecosystems and protect keystone species. We focus on four of them: natural reserves, environmental taxation, payment for eco-system services and supply chain management. Mechanisms might depend on the underlying eco-system that is to be protected.

An overview of alternative governance mechanisms for ocean assets can be found below. [16]



Natural reserves and protected areas

Created by delineating zones with permitted and non-permitted uses, implementation begins with identification of threats and impacts of the site, followed by developing management and monitoring proposals with governments and organizations combined. Specific objectives and regulations can vary across protected areas, for example what is permitted in strict nature reserves may differ from that of national parks.

Key benefits

Natural reserves such as Marine Protected Areas (MPA) offer more financial stability than carbon markets by securing resource supply and stable regulation. They provide a living laboratory to further conduct research. Protection encompasses not solely individual species, but entire ecosystems. They allow for addressing the interlinkages between land, water, and living resources. With the 2030 agenda in mind, an estimated 400,000 to 650,000 jobs could be created in conservation management fields and infrastructure. [2]

Key challenges

Ineffectively managed natural reserves can cause tensions with industries. For instance, MPAs conflict with commercial fishing and others interests who wish to use the water in ways that violate regulation, such as possible negative economic impacts on tourist operators and maritime transportation. Difficult and expensive to survey, monitor and enforce protection large areas, in particular when outside individual jurisdictions (e.g., international waters). Protected area systems still need the assurance of sustainable, long-term funding that can help (by creating enabling economic conditions and by providing funds for emergencies).

Example: Belize MPA network

In Belize there are 14 MPAs along with 13 protected sites for the spawning aggregation of fish. While 23.5% of these areas cover Belize's waters, only a small portion consists of no-take areas. An initiative started in 2013 for the establishment of replenishment zones (zones for fish to grow larger in population). Currently 7.6 per cent of Belize's waters consist of no-take zones. This number must increase to a minimum of 10 per cent in order for the successful conservation of marine biodiversity. Successful no-take zones require compliance from fishers which was pursued by the government through managed access to fishing in waters. Enforcement was further implemented with the Spatial Monitoring and Reporting Tool (SMART) which enabled patrols to monitor human activity such as hunting and fishing. Today this cost-efficient technology is used to more easily detect illegal fishing and point out high-priority areas. This has led to an 85% decrease in infringement on protected marine areas. [17]



Environmental taxation (ET)

Environmental taxation is a governance mechanism which serves to minimize pollution on a macroeconomic level. The most popular form of taxing environmental effects is done through carbon pricing, raising the relative cost of pollution to the environmental effects of certain economic activities. Environmental taxation initiatives can either directly regulate the price of certain activities (tax) or impose an overall quota on a sector's level of pollution (emission trading schemes). Carbon pricing initiatives are prevalent in both North America and the European Union. While carbon taxation makes up 3.6 per cent of the global emissions of advanced countries, the ETS option is more popular making up 13 per cent.

In order to set a price on carbon, governments consider the external costs of greenhouse gas emissions such as damage to crops and health care costs from natural disasters such as flooding, heat waves and droughts. Pricing carbon shifts the burden to those responsible for it and forces them to reduce it. A carbon tax sets a price on carbon emissions by companies and internalizes this into their production costs. The revenue the government receives from carbon taxes can subsequently be invested into sustainability projects. [18]

Key benefits

Macro policies of taxation are deemed some of the most effective ways to offset emissions as they provide direct economic incentives to reduce pollution/carbon emissions. Carbon pricing is also considered a relatively less costly approach to mitigating climate change.

Key challenges

Carbon taxation at a fixed rate provides predictability of carbon costs to invest in low carbon technology. However, fixed carbon pricing does not guarantee a certain carbon budget. Fixed carbon budgets can be achieved with carbon emissions trading platforms at the cost of carbon price volatility which lowers the incentive to pollution reduction.

Example: Ets in Costa Rica and Colombia

Carbon taxes are effective in reducing greenhouse gas emissions by incentivizing reduced usage of fossil fuels. This is critical for countries with the Amazon rainforest within their borders, as the Amazon rainforest absorbs 5% of global carbon emissions every year.

Costa Rica implemented carbon taxes in 1997 which has restored and protected a quarter of land across the country and generated CRC 26.5 million of revenue every year. The revenue is then given to farmers and landowners to fund the restoration and protection of their property.

In Colombia, similar initiatives have been taken, placing a tax on liquid fossil fuels. The tax revenue is partly used to fund projects to protect forests and companies are able to get a tax break if they themselves initiate the reduction of carbon pollution. [19]

Payment for eco-system services (PES)

Natural capital provides a wide range of ecosystem services with direct benefits to humanity. PES is a mechanism that pays landholders for managing ecosystems in ways that benefit others. This provides landowners with an incentive to maintain natural capital that provides the ecosystem services. The beneficiaries may be individuals, communities, businesses, or public bodies. One example are "debt-for-nature" swaps where highly indebted countries receive debt relief in exchange for restoration efforts of natural capital. [16]



Payments can be made by beneficiaries of the environmental services, such as water users and hydropower companies. In other cases, payments can be made by indirect beneficiaries such as national or local governments. Furthermore, the role of the private sector is growing among PES schemes at both international and local levels. While the scheme is widely used on land, coastal and marine ecosystems are becoming a focus of this market-based mechanism.

Key benefits

PES schemes are flexible, easily applied and cost-effective, allowing high customization to local circumstances. PES offer distributional benefits, if communities can improve their livelihoods by offering and selling their ES. PES provides a potential platform to integrate conservation and climate efforts into a common policy framework, and facilitates the transition from an economy of production to an economy of stewardship

Key challenges

A problem for the implementation of PES is weak ownership and tenure rights of forest land. Forest tenure must be clearly defined and recognized and the ecosystem service provider must hold the rights of the service as a pre-condition. This might also generate unwarranted windfalls to owners of large areas of land, could be prone to corruption and might raise land prices through speculation particularly for indigenous communities. Transaction costs also occur while arranging and signing contracts, including economic assessment and information costs, contracting and monitoring costs.

Example: Bhutan's innovative conservation program

Despite being the one of the smallest countries on our planet, Bhutan's commitment to innovative conservation is bigger than most. The government of Bhutan has established three PES schemes, in accordance with one of the four pillars of the Gross National Happiness agenda. In Yukpugang, members of the community forest and the Dzongkhag Water User Group initiated in 2010 a PES, that incentivises the community members to protect the forest from excessive grazing and over-harvesting. Thus, watersheds upstream are maintained and resulting in better water yield. Aside from protecting the recharge zone, the community have to carry out other tasks such as cleaning the stream, afforestation and guarding against illegal logging. The scheme has successfully protected the water source for residents around the Mongar region, leading to a renewing of the scheme in 2020, with parties agreeing to extend the contract term from five years to 10 years. [21]



Supply-chain management for protection

Supply chains face significant challenges to improve their sustainability. The increasing power of multinational corporations has allowed them to avoid repercussions for their harmful actions towards local communities and the environment. To avoid polluting activities being outsourced to countries with lower environmental standards, supply-chain restrictions on pollution (or human-rights violation) might be imposed that hold downstream companies liable for the pollution of their entire upstream suppliers. [22]

To enforce and monitor such restrictions new technologies can help improve traceability. Blockchain certificates, for instance, are one potential way to trace environmental activity more easily across supply chains. Companies can use blockchain applications to track activities with more accuracy. Blockchain can also be used to track raw materials so that they come from sustainable locations.

Key benefits

New legislation holds large corporations accountable. This forces corporations to track the sustainability and environmental impact of their company across their supply chain. New technologies such as supply-chain management via blockchains does not require strong legal protection or administrative capacity, making it advantageous for governing common resources. Blockchains are relatively accessible requiring cheap technology. Blockchains and tokenization could potentially democratize investment and address invisible labour. Blockchain technology would allow for self-enforcement of rules.

Key challenges

Multi-national companies find it difficult to track the full environmental impact as they may not be directly dealing with all suppliers to which production is outsourced. [23] Supply chain tracking offers large amounts of data. Although rarely personal data, this data might be abused to enforce unfair trade laws and unilateral sanctions by the global north or other countries.

New technologies might not always be available. For instance, Blockchain technology is currently only available for 'sophisticated' suppliers. There has to be balance of what actions are tokenized. Blockchain technology use may be biased towards those who code and create the blockchains. There may be general distrust within communities of the new technology.

Example: The UK's Environment Act

An example of legislation for the sustainable management of supply chains is the United Kingdom's environment act that was issued in 2021. The UK is making it illegal for businesses to use products that do not align with local laws serving to protect natural areas. Materials and products such as palm oil, cocoa, rubber and soy therefore have to have been produced under laws to protect natural resources such as forests. The companies would have to carry out due diligence by publishing where their resources are acquired. Failure to comply with 'due diligence' would result in potential fines. Similar legislation has been adopted by the European Union to hinder environmental and human rights violations within raw material industries such as timber, garment and leather production. However, this 'due diligence' law faces challenges as there is no established repercussions for companies. Holding companies liable under law may be a challenge due to various loopholes. For instance, under the EU 'due diligence' law, companies can simply shift the responsibility to suppliers. [24], [25]



Solution Step 2: Leverage governance mechanisms

Public infrastructure to support nature-based solutions

Identify national and international stakeholders

First, considering the various governance mechanisms discussed above, natural capital needs to be managed in an integrated way, taking into account all of the different ecosystem services that it provides. Therefore, all stakeholders need to be involved in the process of mapping and prioritizing ecosystem services. For nature-based solutions to be viable, indigenous peoples and local communities have to be recognised and appropriately compensated for the role in managing biodiversity and ecosystems is highlighted. Indeed, despite their effective stewardship, they often lack access to financial rewards. Nature-based solutions are indeed one way of helping to remedy this shortcoming.

Develop and co-design valuation frameworks

Second, the development of valuation frameworks centred on impacts and dependencies to assist financial institutions. These frameworks evaluate both positive and negative impacts of nature on businesses, clients, and society. Dependencies refer to the effects of nature's contribution to the economy and society.

Third, current international efforts to jointly expand the coverage of frameworks for eco-system services are essential and will need to be further developed. For instance, an upcoming global biodiversity framework is expected to create a pivotal moment similar to the Paris Agreement, with a global goal to halt and reverse nature loss and align financial flows with conservation goals.

Provide adequate market infrastructure

Forth, rather than focussing exclusively on mobilizing public funds for nature-based solutions, governments and regulators need to create enabling conditions for the flow of private finance into nature-based solutions. This can be achieved, for instance, through liquidity provision for private sector through green bonds and asset purchases. [26]

Fifth, free market systems are effective in promoting innovation and progress, provided they can integrate problems like nature degradation that aren't typically accounted for in free market mechanisms. [27] This implies removing subsidies as these can lead to misallocation of resources, industry distortions, and displacement of activities (ex. Example of biofuels).



Sixth, new legal forms, such as the innovative concept of a "natural asset company." This type of company partners with the New York Stock Exchange to issue equity, which is then invested in conservation efforts. These companies focus exclusively on nature-positive activities and employ a unique dual accounting system that tracks both financial indicators and ecosystem key performance indicators (KPIs). This approach is expected to be first implemented in Costa Rica.

Seventh, countries need to put in place proper management of liquidity flows arising from valuation frameworks to limit macro-economic impact and maximize environmental benefits. This can be achieved, for instance, through Sovereign Natural Wealth Funds, similar to the ones that exist for non-renewables. [26]

Eighth, any metric or measurement mechanism needs constant monitoring and evaluation. Even when a metric has been positively evaluated, once in use systems tend to be optimized for the measurement only leading to positive effects that only exists on paper. Constant monitoring and evaluation will detect those shortcomings at an early stage and can tune metrics accordingly to keep achieving the desired results.

Nineth, any management and restructuring of sovereign debt should integrate a natural capital focus, such as, for instance, with debt for nature swaps. This requires larger overhaul of international financial system to avoid negative impact on credit ratings, such as what has recently happened in Ecuador.



Top Quotes by VNC 2022 Speakers, related to Solution Step 2

There is a discrepancy between the growing demand for sustainable investments and the lack of standardized methodologies for assessing sustainability performance that needs to be addressed.

Rodolphe Bocquet

Free markets are essential for economic progress but need to be regulated to take into account the value of nature.

Thierry Arys Ruiz

The existing financial infrastructure often overlooks the true value of companies, especially regarding their impact on the environment and biodiversity. Tokenization can play a crucial role in redesigning financial market architecture, allowing for a more nuanced understanding of the impacts of various industries, such as the food sector.

Marianne Haar

A disconnect exists between societal values and market behaviour. Markets reflect our value system, but often our values are not practiced, leading to a misalignment between market behaviour and desired outcomes. We need to integrate markets into conservation efforts. To save nature, markets must be engaged, which requires a shift in thinking and practices. Markets should not finance extractive activities but instead contribute to preserving nature.

Ralph Chami



3

Financial solutions for preserving natural capital

What options exist to mobilize financial resources to fund conservation efforts?

Financial solutions to protect and leverage natural capital require both the development of new private finance instruments and a well-development market (infrastructure) supported by public activity.

Tokenisation and Decentralised Finance (DeFi) Solutions

Tokenization is the possibility to create a digital twin for an asset, such as a tangible object, a virtual object, a right or even an idea that can be transferred and traded as a whole or in fractions. The process implies a series of technical and legal procedures to upload asset ownership to a digital ledger, for instance a blockchain. In the case of natural capital, this would allow to identify individual species or entire eco-systems as possible recipients of conservation and restoration payments in exchange for carbon credits.

A key component of blockchain technology is its high degree of immutability. Just as the tech has been used for supply chain management/oversight, a credit token's creation, changes in ownership and use can be accurately mapped. Gaming the system by altering a credit's status (perhaps after it has been spent) is made impossible through blockchain's immutability and a system of decentralised consensus. Moreover, token exchanges could enhance the liquidity on carbon offset markets by allowing more types of natural assets to enter the market. This greater access should provide the market with more liquidity and if so, this would allow more accurate and updated bid-ask spreads to be displayed to investors. Currently, exchanges do not have enough data and volume of exchanges to be displaying these accurately. It can also help create an international exchange of carbon trading credits and carbon capture solutions and hence overcome the current market dislocation between the supply of funds and demand for investment into environmental welfare projects. Finally, blockchain can provide a wholistic overview of market activity thereby allowing to identify double counting and other irregularities. Traditional markets where certificates can be privately traded provide less transparency. The use of blockchain-generated transparency could provide a solution independently from international agreements and would only require support by local policy makers.



Yet, decentralised finance solutions face significant uphill challenges. For one, reducing the volatility of the price of carbon is vital to the success of the offsetting markets. The more stable they are the more investors will be willing to commit long-term capital. However, not only have carbon prices fluctuated significantly, they differ considerably across trading platforms (e.g., the EU ETS, California Carbon Credit Market, and Voluntary Carbon Markets, such as the nature-based offset and aviation industry carbon offset markets). For example, in the EU ETS, carbon credit supply is set by government policy whereas demand is principally driven by energy prices, macroeconomic growth and major socioeconomic/geopolitical events. However, in the VCM carbon prices can also differ by project type, the age of carbon sequestration, size of transaction and the Standard used (e.g. Verra, Gold Standard, CAR, ACR). One example of this difference is that the price of carbon credits through Biogas-related projects is greater than Wind power-related projects. As markets are highly segmented, liquidity is low, one key factor behind high volatility of carbon pricing.

Second, currently there is not an internationally/nationally accepted standard for Nature Based Solutions (NbS) and thus no regulatory body responsible for protecting investors. Often these NbSs are based in less developed countries where regulation is weaker with governing bodies having less control or legal power to protect property rights/investors' capital. Blockchain based arbitration can provide some remedy here, but cannot fully compensate limited legal enforcement.

Therefore, what role should regulators in say the US/UK/EU (where the investors/companies may well be based) play in their domestic markets? With very little regulation in the DeFi industry currently, how well equipped would potential regulatory bodies be to manage the combined industry of DeFi and nature-based offsetting in the case of tokenisation. Without this regulation/investor protection, NbSs (with tokenisation) will remain a riskier investment, which may very well dissuade many interested investors that would have a significant appetite (and pot of funds) to invest in such programs.

Finally, blockchain-based solutions raise issues of sustainability themselves. Notoriously, the first generation blockchain system requires an immense amount of electricity (most often produced through carbon-intensive means) to operate – most famously Bitcoin. This is due to them using the proof-of-work system. However, new consensus mechanisms have been introduced, notably proof-of-stake, that significantly reduce the first generation blockchains high energy cost. In the second half of 2022, Ethereum has transitioned to a proof-of-stake system, dubbed *The Merge*. It introduces a highly scalable multi-level blockchain architecture which not only solves the energy consumption problem, but also scalability issues. After all, despite its immense energy consumption, Bitcoin only allows seven transactions per second. The success of this new Ethereum system seems to be significant because Ethereum is the basis for thousands of crypto currencies, tokens systems, DeFi and other smart contract based blockchain applications.

Social Climate Fund

Currently, the receipts of carbon offsets and environmental taxes are recovered by (national) governments and mostly used for other, often non-environmental purposes (e.g., reduction in labour taxes as done in Germany). Instead, these receipts could fund a social climate fund that is being used to finance preservation efforts (e.g., MPAs and PES) including in other jurisdictions. A lighter version of a Climate Fund would be to issue green bonds to direct financing towards certain environmental purposes.



Such a fund could promote green transition via public expenditure/investment in green transition projects. This can be complemented and supported through green monetary policy by helping policy makers to raise funds specifically for environmental action. One key benefit of such a Climate Fund would be to generate sufficient liquidity in the market that helps reduce the volatility of carbon credits. In particular, such a fund could absorb price fluctuations through its own reserves, something individual investors are not easily able to do.

Yet, several challenges emerge, often similar to the ones for DeFi solutions. Some of the operational risks would most likely be absorbed by the climate fund's budget. Nevertheless, the risk remains that if a project went unfinished and thus no offsets were realised, then the capital that the fund had invested in may be lost. This may dissuade sovereign climate funds from investing in less developed countries where property rights/judicial system are less well formed, or extreme weather events are more likely. Generally speaking, a bias towards investment in national natural assets will remain, compounded by exchange rate risk with large capital outflows to low-income jurisdictions. Moreover, recipient countries might fear reputation risk/sovereign debt risk of debt-to-nature swaps and other financial flows that affect their balance of payments. Finally, with a climate fund being controlled by a governmentally appointed group/institution, political pressure may arise if a) the results of the fund do not meet the public's expectation; b) these funds are not spent on domestic climate projects; c) a country comes under financial strain and thus the budget of the fund is cut. Unless a clear mandate with well understood expectations and enough independence are set out, political pressure may see a climate fund's performance hampered.

Green bonds

Green bonds offer bond issuers the opportunity to receive cheaper funding, in return for investing in sustainable projects. They are an encouragement for bond issuers to change to a greener business model, much like a rewards system. Investor might choose green bonds to ensure their capital is being worked to support the shift to being more sustainable. This comes at the price of receiving less return on investment as the interest rate on a green bond is typically lower than a conventional one, much like a green premium. Despite the lower ROI, most investors have an ESG criteria upon which their investments' performance is judged too. This price/yield of green bonds is decided by bond markets, with the demand for sustainable investment matched by the supply of corporations willing to issue green bonds. With green bonds very similar in structure to conventional bonds, they fit into the current capital markets and so investors don't have to update their investment analysis.

According to the Climate Bond initiative the size of the green bond market as of 2021 is roughly \$1.6trn, growing roughly \$523bn that year and compared to a market that was only worth \$104bn in 2015. However, with the next target for global green investments at \$5trn annually by 2025, the market for green bonds has a significant way to develop and thus faces typical challenges for such a new and fast-growing financial instrument. [28]

At the time of creation, green bond markets were smaller, and issuers needed to be convinced to enter the market. Thus, several standards were created to help set a precedent for the market such as the International Capital Market Association's (ICMA) Green Bond Principles (GBPs), which were formed in 2014. However, there is no globally recognised issuance standard, none with any actionable legal precedence, and they are by definition voluntary to follow.



Due to this reliance on voluntary participation/compliance, preventing companies from taking advantage of the market that intend to misrepresent their activities is difficult. The opportunity to raise cheaper (green) capital, while improving one's reputation through mislabelling a bond issuance as green for a very limited cost is a material risk that is difficult to protect against. Thus, if appropriate standards are not widely recognized, the risk for greenwashing cannot be excluded. Furthermore, there is very little protection for investors in the case that an issuer breaches its green investment mandate. In this event, the issuer is not obliged to immediately repay or increase its coupon payments, which may be the case if a conventional bond issuer was to break its investment mandate. Even though the investor can sell said green bonds, this may well be at a loss and so the onus of the breaching of a green investment mandate would be on the investor. Fundamentally, this raises the question as to why governing bodies have not stepped in with further regulation to prevent a mismatch between investor and issuer incentives.

Although there are standards to follow for green bond issuers, there is no single globally recognised code. None have any actionable legal precedence, and so far, they are only voluntary to follow. One prominent one is the International Capital Market Association' (ICMA) Green Bond Principles (GBPs), which were formed in 2014.[29] At the time of creation, green bond markets were smaller, and issuers needed to be convinced to enter the market.

Therefore, the current standards and lack of regulation will need to be updated and implemented as the market grows. As long as such standards are not widely recognized, the risk for greenwashing cannot be excluded, in particular if a company has the opportunity to raise cheaper (green) capital, while improving their reputation by labelling a bond issuance as green for a very limited cost. Increased transparency by recording transactions and certificates on a blockchain based system, can help address these problems by preventing double-counting of carbon sequestration measures, for example. Since the green bond market is based on voluntary participation/compliance, preventing companies from taking advantage of the market that intend to misrepresent their activities is difficult.



Green Bond Principles

Voluntary Process Guidelines for Issuing Green Bonds

June 2021
(with June 2022 Appendix 1)





Solution Step 3: Mobilize private sector funding for nature-based solutions

Against the proliferation of green financial instruments, the challenge will be to scale up their use to provide sufficient funding for nature-based solutions

Mainstream nature-focus across different financial actors

First, demand for environmental projects is growing. Both investors and corporations are keen to find opportunities to provide funding for environmental projects that support the well-being and sustainability of nature. Often, this will involve the use of blended finance by combining fiscal Instruments with private finance: Notably, the growing utilization of green bonds, carbon pricing initiatives, and fiscal reforms to address environmental concerns is emphasized, indicating a shift towards sustainable investments.

Second, mainstreaming nature-based funding requires the involvement of all financial actors, public and private. Significant efforts also need to come from central banks and financial regulators in addressing climate-related issues through climate risk assessments, disclosure requirements, and regulatory frameworks are highlighted, with a call for more extensive focus on the modern digital landscape and emerging technologies.

Third, financial regulators play a key role in developing the market. There is an increasing role of regulation in driving sustainable investments, with a significant focus on regulatory changes in the European Union. The impact of regulatory actions on the investment landscape needs to be explored and developed more. For instance, the Network for Greening the Financial System (NGFS) is developing climate stress testing scenarios to help investors assess the resilience of their portfolios to climate change risks. Stress testing often reveals a maturity mismatch between financial returns and nature-oriented impacts.

Create space for nature-based financial innovations

Forth, innovative financial solutions such as DeFi and green bonds are central to redefining the relationship between human, natural and financial capital. A multi-disciplinary collaborative approach that includes open digital and fintech solutions are integral to ensuring access to robust, consistent, and trusted value factors to shift the flow of global capital to nature-positive outcomes.

Forth, nature-based DeFi solutions will require tokenisation of natural resources. Tokenization is the securitization of assets on a blockchain, representing a range of tangible and intangible assets, such as real estate and natural resources. Tokenization and data can play a crucial role in redesigning financial market architecture, allowing for a more nuanced understanding of the impacts of various industries, such as the food sector, and for fungibility of different value systems.



Tokenization should go beyond financial aspects and should include decentralized governance to ensure social responsibility also regarding the trading of the tokens.

Fifth, a shift in management practices needed to make nature-based solutions a reality. Understanding how businesses manage their impact on biodiversity is more crucial than simply assessing risk exposure.

Strengthen oversight and ensure proper nature-based audits

Sixth, the existing financial infrastructure often overlooks the true value of companies, especially regarding their impact on the environment and biodiversity. At the heart lies a conflict of interest and lack of transparency among sustainability data providers and rating agencies, which are underscored as significant concerns in the sustainable investment landscape.

Develop and implement transparent standards

Seventh, tokenized nature-based assets need to be backed by real assets, verified by transparent and regular audits. Such audits are lacking because of an absence of standardized methodologies and data, making it difficult to accurately assess environmental impacts and risks. The more complex issues, the higher the data standards necessary (e.g., biodiversity vs carbon credits) and the more important a need for clear communication and transparency in reporting sustainability-related data to investors

Top Quotes by VNC 2022 Speakers, related to Solution Step 3

Innovative financial solutions such as defi and green bonds are central to redefining the relationship between human, natural and financial capital.

Katherine Foster

To encourage banks to shift away from funding fossil fuel projects is a critical challenge. This requires redefining risk evaluation and move beyond traditional investments, thereby avoiding the pitfalls of greenwashing.

João Braga

Combining centralised regulation and private sector initiative, the market could take a leadership position and agree on a set of voluntary guiding principles to bring us towards net zero.

Irina Likhachova

Tokenization, involving the securitization of assets via blockchain, holds the potential to revolutionize the future of natural capital.

Takhmina Nasimova

Private sector leadership is vital in driving change. Financial institutions are leading in nature-based solutions and portfolio alignment can influence regulations and set industry standards, as seen in the Task Force on Climate-related Disclosures.

Jessica Smith



4 Triple Wins

How to create triple wins?

Planetary health *is* human health. A healthy planet means less risk of disease outbreaks, greater political stability, and a reduced threat environment. It can eliminate food scarcity and pollution allowing more people to live lives of abundance instead of adversity, and it can increase wage equality, creating a stronger, more vibrant, global economy and workforce. It builds a future that all of us can support. To that end, creating triple wins that are good for nation states, their constituencies, and the environments for which they live is of vital importance.

Achieving Triple Wins – the triple bottom line

The triple bottom line offers an accounting concept for companies to take into account the financial, ecological and social impact of their activities. Valuing Natural Capital suggests extending this approach to measure the changing Wealth of Nations.[30] Indeed, measuring a country's wellbeing through the lenses of GDP is no longer sufficient as it focuses exclusively on the costs of going "green" without accounting for the significant contributions of a healthy and thriving biosphere to our wellbeing. Reimagining our economies around the triple bottom line requires a proper valuation of ecological services of natural capital as discussed above to set it against the financial costs associated with company-, industry- and economy-wide "greening" of our activities.

A triple win can only be achieved through protecting the environment, regenerating biodiversity, and reducing the carbon footprint of our economic activities. This means we need to bring on board business leaders, lawmakers and social partners to recognise that absent a healthy planet you do not have a healthy population to consume your goods and services. Indeed, social inclusion and decent work translate into an improvement in GDP per capita, with benefits for health and wellbeing. According to the WHO, the reduced health risks via cleaner air showed a statistically significant link between air pollution and labor productivity on farms in California. Similarly, a decrease in ozone concentration by 20 per cent has been shown to increase worker productivity by 4.2 percent. The net takeaway is that taking care of the environment does not only generate ecological but also economic benefits. Similar benefits can be achieved through first-best practices in sourced pollution reduction techniques, the proper establishment of waste-to-energy power (recycling plants), a reduction in the dependence of coal while providing some financial incentives to invest in new technologies and decarbonizing the healthcare industry via novel digital health services.



To fully achieve triple wins, we must also ensure a passionate and healthy workforce that needs to be mobilized for both economic and ecological gains. Currently, standard indicators such as the Human Development Index (HDI), Social Progress Index (SPI), or the Gini Coefficient measure the extent to which the world of work is either progressing or regressing. What these indicators do not account for, however, is the extent to which social and ecological progress is intertwined. Something as basic a core human need as clean air is necessary for a workforce' ability to thrive in an environment devoid of pollution.

Growing dirty now and cleaning up later is not an option. Both pursuing growth, then worrying about its environmental consequences and promoting environmental sustainability, then worrying about its growth implications is inefficient, especially when we consider how pollution affects labour through to a decline in health and a rise in mortality. Valuing natural capital offers an alternative to formulate joint green and growth policies that jointly mobilize the natural, financial, physical and intellectual capital available to each country.

This chapter of history is ours to write. Paying due consideration to triple wins has the potential to net all of us – and our planet – significant gains for generations to come.



Solution – Step 4: Create triple wins

Triple wins are an essential building block in any nature-based solution. Without delivering benefits to local communities that act as stewards of eco-system services, these systems will quickly be eroded by other economic interests that are likely to draw down or even completely destroy local eco systems. Triple wins don't come easy, however. They will require a few key ingredients for success.

Trust and the role of the state – Multi-stakeholder approach

First, a radical collaboration within and among nations is crucial. Building trust through collaboration enhances accountability and encourages cooperative intentions. Trust-building is a virtuous cycle that can be enhanced through collaboration, self-awareness, and mutual accountability.

Second, a triple win approach needs to be viewed through the lenses of government, society (community), and the market, as well as other potential stakeholders like donors or policymakers. Community acts as a foundation for sustainable development and will allow to hold governments and markets accountable, especially as regards the challenge of addressing greenwashing and the need for true commitment to environmental, social, and governance (ESG) principles.

The future of growth

Third, triple wins require a renewed thinking of our way of life, which has become unsustainable. Currently, limits of growth have been reached and will lead to significant deterioration of living standards under any business-as-usual assumption. Moving toward a more sustainable world requires a paradigm shift in values and society, with a focus on meeting human needs within planetary boundaries. However, rethinking growth needs to consider not only trade-offs with planetary boundaries but also the distribution of costs and benefits of the transition, in particular as regards the need for development in low-income countries.

Forth, a key element of moving towards triple wins require true accounting for costs and benefits of current patterns of consumption and production. No counting without proper accounting. This includes to consider the historical exploitation of natural resources to determine fair pricing. Historical injustices and social justice issues need to be factored into economic considerations for a more equitable approach.

Integrated approach

Fifth, where appropriate sector, value-chain or holistic approach are necessary when considering nature-based solutions. Holistic approaches will give a more complete picture of the costs and benefits but might be difficult to establish. Sector-based solutions will allow easier accountability but might not allow to give a full overview of the benefits of any eco-system service.



Sixth, importantly, whole-of-government approaches are necessary, involving Ministries of Finance, the Economy and the Environment. This can be achieved through a strategic government vision, combined with national development plans and national development boards or sovereign wealth funds. Concretely, green policy guidelines should be integrated into fiscal and economic policy making processes.

Seventh, financing the green agenda requires substantial resources, often exceeding the GDP of a country, especially in the Global South. Triple wins offer substantial benefits for such countries as bringing natural capital on the balance sheet of countries would strengthen their national accounts and support governments in undertaking other essential services such as social protection or education.

Eighth, for triple wins to become a reality globally, restructuring of the global financial architecture is necessary. Developing nations need support to help them in their transition to a sustainable economy that delivers both economic development and ecological sustainability. This will require collaboration and financial assistance, for instance by allowing easier access to non-standard financial restructuring through debt-for-nature swaps.

Top Quotes by VNC 2022 Speakers, related to Solution Step 4

We need to envision an economy where nature, local communities, and economies all benefit. This Triple Win model aims to create a thriving and equitable ecosystem.

Ralph Chami

The triple win approach needs to be viewed through the lenses of government, society, local communities, and the market, as well as other potential stakeholders like donors or policymakers.

Nidhi Batra

Valuing natural capital implies that there's a principle of return on investment, which is proprietary in the business language. But that there's also the principle of integrity of ecosystems if we are to seek the long-term longevity of the natural way.

Maxim Vergeichik

Investing in sustainability generates economic and societal benefits beyond ecological ones. Companies with clear sustainability strategies can experience increased consumer support, higher share prices, and improved employee retention.

Walid Al Saqqaf

Current global crises are interconnected, including the pandemic and ecological collapse. This highlights the importance of valuing nature beyond its utilitarian function.

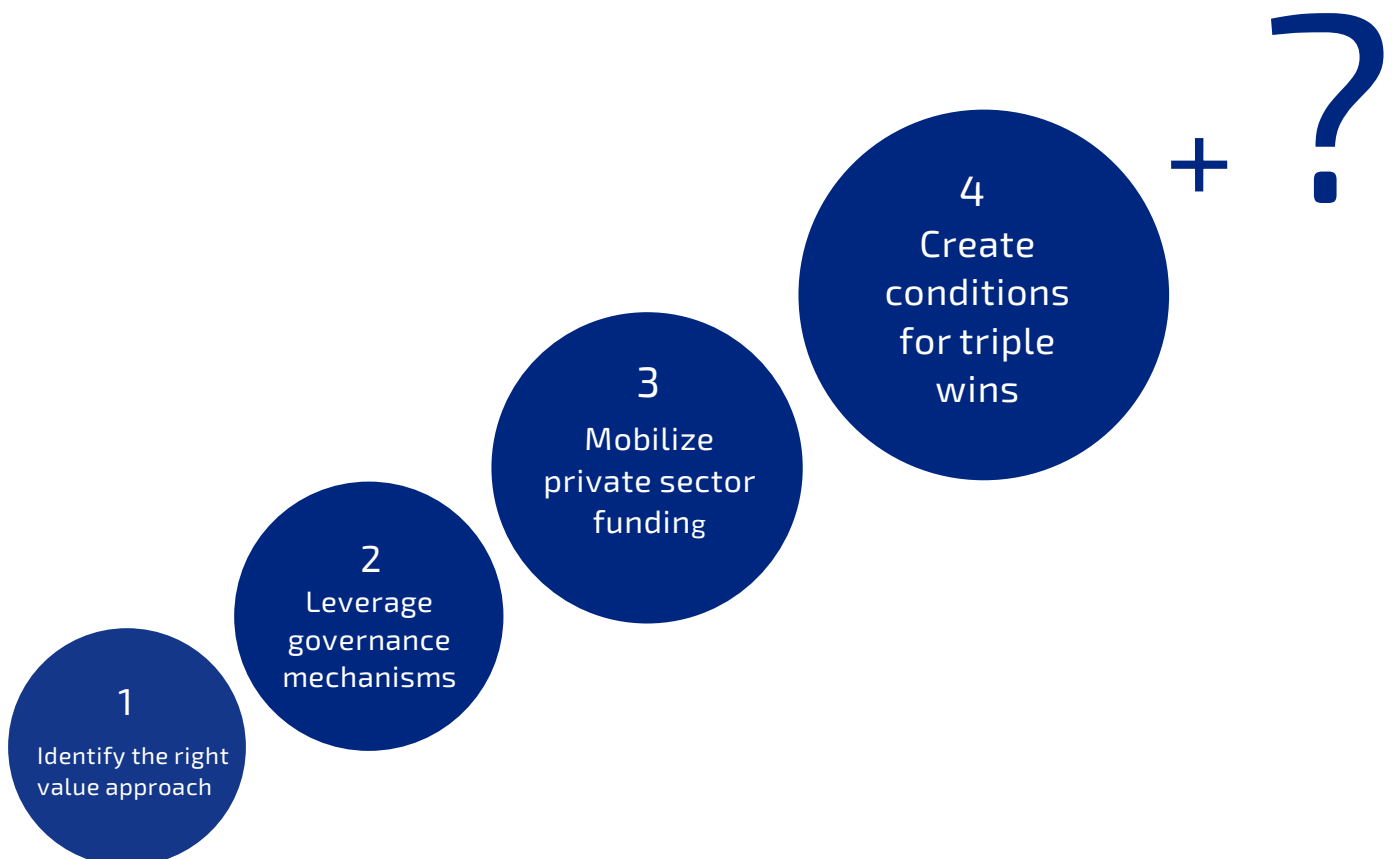
Aiaze Mitha

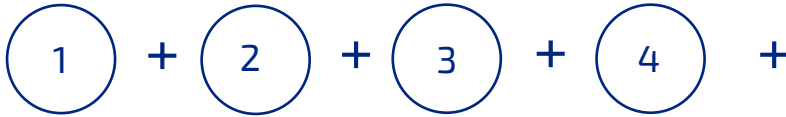


5 Pathways to nature-based solutions

How to get to implement nature-based solutions at scale?

This Geneva Macro Labs Solutions Paper has proposed a series of key elements that are required to successfully implement nature-based solutions to Value Natural Capital. A key challenge, however, rests in how to get to broadly apply these solutions across various eco-systems, countries, and communities. Our conference participants offered some valuable insights in this respect.





Solution Step 5 : Open paths to nature-based solutions

Prioritize high-value projects focused on specific valuation mechanisms

First, an essential step is to focus on scalability of any nature-based solution undertaken. This means to set up demonstratable pilots in specific jurisdictions and with key keystone species that are essential to excite communities, investors, and stakeholders, laying the groundwork for future expansion and the development of a robust scientific framework for global implementation.

Second, institutional and corporate initiatives are needed. For instance, the EU and the Task Force on Net Financial Disclosures are driving sustainability efforts, providing valuable insights and learnings for corporations and institutions to build upon. A pioneering approach is crucial for fostering advancements in sustainability, importance to generate learning to transmit to other sustainability projects and eco-system areas.

Broaden focus of taxonomies to reflect heterogeneous value systems

Third, projects that incorporate carbon, nature, and human welfare while aligning with the SDGs are more appealing to investors due to their broader ESG appeal and potential value creation.

Forth, constant baseline analysis and monitoring need to be built into any nature-based project. Establishing a baseline can be achieved through comprehensive environmental DNA (eDNA) analysis in specific locations in order to enable the monitoring of biodiversity richness and the impact of keystone species on the ecosystem, facilitating a holistic understanding of ecological dynamics. [31]

Implement pilot studies and sandboxes using whole-of-government approaches

Fifth, climate and sustainability challenges require a holistic approach, combining innovative policy instruments, business models, technologies, and cooperative strategies across various levels of governance. These will need to be reflected in the elaboration of the respective business models for each individual nature-based solution.

Sixth, nature-based solutions require rethinking whole sectors. For instance, to address climate challenges, it's not enough to just replace combustion cars with electric vehicles. A broader perspective is needed, considering whether the need for mobility can be fulfilled with less vehicular traffic through urban design and digital technology. The digital transformation will play an essential role in helping set up nature-based solutions at scale. [32]

Set up climate clubs and trust funds to scale up

Lastly, nature-based solutions cannot be set-up in isolation. Their benefits are global and so should be their rewards. Climate clubs allow to collect these rewards for the benefit of the communities that act as stewards of their natural capital. Moreover, given that size and fluctuation of these rewards, climate funds will need to be set up to ensure that future generations can benefit from the conservation efforts as well.

Top Quotes by VNC 2022 Speakers, related to Solution Step 5

We are at peak human welfare globally speaking right now. If we want to keep it, a paradigm shift is needed, that will require from us to decide what we truly value in our society and in shape our society around meeting human needs within planetary boundaries.

Gaya Herrington

Incremental innovation aimed at maintaining existing products and value chains is insufficient. A transformative approach is needed to satisfy core human needs while radically changing how they are fulfilled.

Massamba Thioye

Using big data and AI to understand complex problems at scale can help identify leverage points for effective intervention.

Rachel Kropa

Developing nations face challenges due to climate change while holding rich biodiversity and natural resources. There is a need to develop a new development paradigm that recognizes the interconnectedness of human well-being and the health of the planet.

Federico Bonaglia

African countries are at various stages of valuing natural capital. Leading countries like Rwanda can serve as examples for others, fostering learning and collaboration among developing nations.

Thierry Watrin

Want to know more? Some suggested further reading

- [1] [The economics of climate change: no action not an option | Swiss RE](#)
- [2] [Valuing nature conservation | McKinsey](#)
- [3] [Carbon removals from nature restoration are no substitute for steep emission reductions | ScienceDirect](#)
- [4] [Despite severe drought, Amazon deforestation continues to slow | Mongabay](#)
- [5] [Amazonia as a carbon source linked to deforestation and climate change | Nature](#)
- [6] [Nature's Solution to climate change \(A strategy to protect whales can limit greenhouse gases and global warming\) \(imf.org\)](#)
- [7] [How much is a whale worth? Millions to combat climate change \(nationalgeographic.com\)](#)
- [8] [Seagrass and Seagrass Beds | Smithsonian Ocean \(si.edu\)](#)
- [9] [Importance of seagrasses: A review for Fiji Islands \(ijcs.ro\)](#)
- [10] [The Role of Mangroves Forests in Decarbonizing the Atmosphere | IntechOpen](#)
- [11] [The secret work of elephants | Finance & Development](#)
- [12] [How much is an elephant worth? Valuing natural capital to protect nature and improve wellbeing - Development Matters \(oecd-development-matters.org\)](#)
- [13] [Methodological assessment regarding the diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services | IPBES secretariat](#)
- [14] [Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows | The Guardian](#)
- [15] [Ecosystem services accounts: Valuing the actual flow of nature-based recreation from ecosystems to people.](#)
- [16] [Frontiers | The Role of Blue Carbon in Climate Change Mitigation and Carbon Stock Conservation \(frontiersin.org\)](#)
- [17] [Case study: Belize – Towards Expansion of No-Take Areas in the MPA System | Commonwealth \(thecommonwealth.org\)](#)
- [18] [Carbon Tax Basics - Center for Climate and Energy Solutions \(c2es.org\)](#)
- [19] [Carbon taxes are key to stop deforestation \(climatechangenews.com\)](#)
- [20] [Debt-for-Climate Swaps: Analysis, Design, and Implementation \(imf.org\)](#)
- [21] [Conserving water resources with PES, an example from Yakpugang | Kuensel Online](#)
- [22] [Towards a mandatory EU system of due diligence for supply chains \(europa.eu\)](#)
- [23] [Starting at the source: Sustainability in supply chains | McKinsey](#)
- [24] [World-leading new law to protect rainforests and clean up supply chains - GOV.UK \(www.gov.uk\)](#)
- [25] [Dangerous gaps undermine EU Commission's new legislation on sustainable supply chains - ECCJ \(corporatejustice.org\)](#)
- [26] [Financing the green transition. The role of macro-economic policies in ensuring a just transition](#)
- [27] [The price is not right](#)
- [28] [Sustainable Debt Global State of the Market 2021 | Climate Bonds Initiative](#)
- [29] [Green Bond Principles Voluntary Process: Guidelines for Issuing Green Bonds](#)
- [30] [Changing Wealth of Nations \(CWON\) \(worldbank.org\)](#)
- [31] [Environmental DNA \(eDNA\)](#)
- [32] [The AI trilemma: Saving the planet without ruining our jobs](#)

Our VNC2022 conference speakers

The Geneva Macro Labs thanks all those who contributed their expertise to the VNC2022 discussions on our journey to develop and promote tangible, impactful and scalable solutions to climate change.

Adam Wood, Department of Economics, Harvard University

Aiaze Mitha, Digital Finance for the SDGs Lead, UNDP and UNCDF

Arun Gosh, Climate Data and Technology Leader, KPMG US

Edua Dickerson, Vice President, ESG & Finance Strategy, ServiceNow

Federico Bonaglia, Deputy Director, OECD Development Center

Gaya Herrington, Vice President ESG Research, Schneider Electric

Irina Likhachova, Biodiversity Finance Lead, International Finance Corporation

Jessica Smith, Nature Lead, UNEP-FI

João Braga, Economist, Brazilian Development Bank

Katherine Foster, Executive Director, Green Digital Finance Alliance

Lee White, Minister of Water, Forests, the Sea and Environment, Gabon

Marianne Haar, Technical Sector Finance Lead, Taksforce on Nature-Related Finance Disclosures

Martin Koehring, Former Head of the World Ocean Initiative, The Economist

Massamba Thioye, Project Executive, UNFCCC

Maxim Vergeichik, Senior Nature Economist, UNDP

Nathalie Hilmi, Economist, Monaco Scientific Center

Nidhi Batra, Development Practitioner, World Bank

Rachel Kropa, Managing Director, FootPrint Coalition

Ralph Chami, Assistant Director IMF, Co-Founder BlueGreenFuture, Rebalance Earth

Rodolphe Bocquet, Vice President, Clarity AI

Takhmina Nasimova, Head of Business Development and Marketing, AgAu AG

Thierry Arys Ruiz, CEO & Chairman, AgAu AG

Thierry Watrin, Green Economy Advisor, Ministry of Finance, Rwanda

Walid Al Saqqaf, Founder and CEO, Rebalance Earth

Nature is our most important resource in the fight against climate change. Implementing solutions to finance its conservation and restoration should become our highest priority.



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