



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
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VALUING NATURAL CAPITAL

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Catalyzing Innovation

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WASHINGTON DC, MARCH 25-29, 2019



Abstract

Natural capital has been defined by the Natural Capital Protocol (NCP) as the “world's stocks of natural assets which include geology, soil, air, water and all living things”. Green finance and green growth offer unprecedented opportunities for financial institutions to invest in natural features such as woodland, peatland and wetland. Natural capital can catalyse new partnerships and foster innovation between financial institutions, land owners, environmental organisations and government. With a range of “values” being attached to natural capital assets, it’s important to note the distinctions between the value of an asset as it stands for sale / notional sale, the evaluation of an asset for its deemed or perceived benefits / disbenefits associated with its existence, enjoyment, environmental or aesthetic contribution, and the evaluation of an asset for strategic decision-making purposes. Relevant parties need to be au-fait with the range of “values” being calculated and their origins.

Key Words:

Evaluation, innovation, natural capital, valuation



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



VALUING NATURAL CAPITAL

1. THE BACKDROP

Natural capital has been defined by the Natural Capital Protocol (NCP) as the “world's stocks of natural assets which include geology, soil, air, water and all living things”. It is from this natural capital that humans derive a wide range of services, called ecosystem services, which make human life possible.

Ecosystem services has been defined by the Millennium Ecosystem Assessment (MA), to be; "the benefits people obtain from ecosystems." The MA classifies ecosystem services under:

Supporting services: The services necessary for the production of all other ecosystem services including soil, photosynthesis, biomass, nutrients and water;

Provisioning services: The products obtained from ecosystems, including food, fibre, fuel, genetic resources, power and fresh water;

Regulating services: The benefits obtained from the regulation of ecosystem processes, including air quality regulation, climate regulation, water regulation, erosion regulation, poaching regulation, natural hazard regulation;

Cultural services: The non-material benefits people obtain from ecosystems through spiritual enrichment, recreation and aesthetic experiences – thereby taking account of landscape values, use and non-use benefits to buyers and users.

The United Nations 17 Sustainable Development Goals, a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection. A quick glance at the Goals themselves highlights that many of them are dependent on the maintenance and enhancement of the world's stock of natural capital and that this will be key to the successful attainment of many of those goals for example, Good Health and Well-Being, Clean Water and Sanitation, Affordable and Clean Energy, Climate Action, Life Below Water and Life on Land.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



The Economics of Ecosystems and Biodiversity (TEEB), a global initiative focused on “making nature’s values visible” whose principal objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels brought natural capital concepts into global focus.

The valuation process defined by TEEB involves three levels:

Recognising value, i.e. identifying the wide range of benefits in ecosystems, landscapes, species and other biodiversity-linked aspects

Demonstrating value, i.e. using economic tools and methods to make nature's services economically visible

Capturing value, i.e. incorporating ecosystem and biodiversity benefits into decision-making through incentives and price signals.

In this process, valuation is not seen as an end in itself; it is rather meant to provide a framework for better-informed decision-making.

The NCP introduced a policy framework in 2016 designed to standardise the approach to assist organisations to identify, measure and value their direct and indirect impacts and dependencies on natural capital. The Protocol harmonises existing tools and methodologies, to guide organisations towards making informed decisions of their impact and dependencies on natural capital.

There has also been a considerable body of work completed by international stakeholders around assessment and accounting for natural capital. This has been led by the UN under their ‘System of Environmental-Economic Accounting’ (SEEA) approach and contains the internationally agreed standard concepts, definitions, classifications, accounting rules and tables for producing internationally comparable statistics on the environment and its relationship with the economy.

Similarly, ‘Wealth Accounting and the Valuation of Ecosystem Service’ (WAVES) is a World Bank-led global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. These programmes are hugely beneficial in the organisation, management and representation of data.

The significant piece of work to reference from a UK viewpoint is the UK National Ecosystem Assessment (NEA) published in 2011.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



This was the first analysis of the UK's natural environment in terms of the benefits it provides to society and continuing economic prosperity. It was an inclusive process involving government, academia, NGOs and private sector institutions and covered terrestrial, freshwater and marine ecosystem services across the UK. The assessment contained 6 key messages:

The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision-making;

Ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society;

The UK's ecosystem services are currently delivering some services well, but others are still in long term decline. Out of total range of services approx. 30% are declining;

The UK population will continue to grow, and its demands and expectations will continue to evolve. This is likely to increase pressure on ecosystem services in the future and climate change will have an accelerating impact;

Actions taken, and decisions made now will have consequences far into the future. It is important that these are understood so that we can make the best possible choices, not just for society now but also for future generations;

A move to sustainable development will require an approximate mixture of regulations, technology, financial investment and education as well as changes in individual and societal behaviour and adoption of a more integrated, rather than conventional sectoral, approach to ecosystem management.

The UK NEA was the driver for the formation of the Natural Capital Committee (NCC) in 2012, an independent advisory body to Government on the sustainable use of England's natural capital - its forests, rivers, atmosphere, land, wildlife, oceans and other natural assets. A UK NEA follow-on phase was published later in 2014. In summary, this resulted in the development of principles, methodologies and functional tools to guide inclusion of ecosystem services in both policy-making and decision-making.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



While all this was occurring, the private sector was beginning to take note. CIMA, the Chartered Institute of Management Accountants, published their paper “Accounting for Natural Capital – The elephant in the boardroom” in 2014. This incorporated a call for the profession to take centre stage in development of methods of accounting for natural capital.

All of this led to the development of corporate Natural Capital Accounting (NCA) which resulted in the NCC working with a consortium of both public and private sector organisations including PwC to develop a framework for organisations to take better account of the natural capital they own, depend on, or for which they are responsible.

This was based on the recognition of that fact that it is the private sector who owns and manages the majority of natural capital in the UK. In England for example, over two thirds of land is privately owned.

NCA has been defined by the NCP as the process of calculating the stocks and flows of natural resources and services in a given ecosystem.

Better management of natural capital can significantly increase the value we derive from it and the way in which organisations manage their business can have profound impacts on natural capital. Over the course of 2014 there were pilots of the Corporate NCA framework with four major landowners - The National Trust, Lafarge Tarmac, The Crown Estate and United Utilities. On completion of the pilots the NCC published several documents.

In 2016 the NCC was reformulated and there was reiteration of the fact that the Government’s goal is to leave the environment in a better state than it was found. The Environment Plan launched at the beginning of 2018 sets out Government’s goals for improving the environment within a generation. It details how Government will work with communities and businesses to do this.

2. ROYAL INSTITUTION OF CHARTERED SURVEYORS (RICS) PUBLICATIONS

RICS, mindful of all the developments on the subject of natural capital and ecosystem services and seeing the need for the profession to engage, in 2012 commissioned their first Thought Leadership paper from Charles Cowap on the subject of natural capital and ecosystem services “Challenges for international practice: from market value to natural value”.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



This highlighted how new approaches to the valuation, appraisal and management of natural capital and nature's services - ecosystem services – promised to transform the way land is managed, development is undertaken, assets are appraised and valued, and a range of goods and services previously taken for granted are paid for. The paper predicted that developments in the ecosystem services arena would have far reaching implications for the work of chartered surveyors in valuation, estate and property management, construction, property development and environmental services.

“Value of natural capital – the need for chartered surveyors”, the second paper commissioned from Charles Cowap published in 2017, developed RICS thinking on the topic of ecosystem services. The paper reviewed the broad topic of environmental valuation from the perspective of a practicing valuer, land manager or estate manager and approached the field of economic valuation of the environment from a professional valuation perspective.

3. VALUATION

3.1 CONVENTIONAL VALUATION

This second RICS paper outlined that valuers are familiar with the rigours of a commercial market place for their services. This underlines the importance of protocols and processes for the preparation of a valuation from the initial instruction through to reporting and follow-up advice. No less important is the choice of method, and the collation and analysis of physical, economic and financial data.

Valuers in most disciplines will have studied a core valuation syllabus which emphasises the primacy of transaction analysis and comparison (the comparable method), income models (the investment method, profits method, residual, discounted cash flow) and cost of replacement approaches (Depreciated Replacement Cost). They will also have absorbed the importance of working from a clearly-defined Basis of Value – traditionally Market Value but increasingly other bases of value are in use. Knowledge for professional practice in valuation has been hard-earned over the years, not least when the work of valuers has been exposed for scrutiny in the courts in the course of a negligence claim but also in other disagreements over compensation based on land values, rents on review and other value-based disputes.

It is not surprising therefore that valuers often view wider concepts of value and worth with scepticism. Yet valuers are often required to value the un-valuable. For example, the value which must sometimes be ascertained for an unassignable traditional agricultural tenancy for tax or other purposes.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



The law on tax valuations evolved through the twentieth century to devise the conceptual schemes in which valuations like this could be undertaken. Even so, such valuations tend never to be very far from the market place – looking for the market value of underlying assets or related interests in the same property. It is against this background that valuers tend to be wary of methods which are more remote from the market place of day to day transactions.

The conventional RICS valuer adheres to RICS Valuation – Global Standards 2017 (The Red Book) which outlines the following bases of value which are defined in the International Valuation Standards - most of which are in common use, albeit they may not be universally adopted in all markets:

Market value

Market rent

Investment value (or worth)

Equitable value (previously, IVS defined fair value)

Synergistic value

Liquidation value

In addition, for the purposes of financial reporting, fair value (under International Financial Reporting Standards) is widely recognised (including by RICS) and used, albeit again not universally.

For some valuation assignments, specifically in relation to certain jurisdictions within which there may be mandatory requirements, another basis of value may be specified or appropriate.

Where this is so the valuer must define clearly the basis adopted and, in any case where adoption of the basis is other than mandatory, explain in the report why use of a basis reproduced in the global standards is considered in appropriate.

3.2 ECONOMIC VALUATION

In contrast to conventional valuation approaches, the language and approaches of environmental valuation are presented in the second RICS paper to enable parallels to be drawn with the professional and technical procedures that are familiar to professional valuers when dealing with the valuation of conventional property assets in established (actual or notional) market contexts.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



While this paper outlined examples of grasslands and woodlands, the approaches involved can be applied across a range of natural assets. Naturally, care is required to ensure that clients fully understand the nature of the advice being provided.

Economic valuation draws on far more bases of valuation than conventional property valuation. Whereas the professional valuer's menu consists of market value, investment value / worth, and fair value plus a few occasional others as previously outlined, the environmental valuer has a far greater choice.

This section offers a non-technical summary of the main value concepts adopted by environmental valuers, or in traditional valuation terms the bases of value used by environmental valuers.

Altruistic value: The value we place on the knowledge that environmental resources are available for other beneficiaries even if no personal benefit is derived from them.

Bequest value: The value we place on the knowledge that environmental resources will be available for future generations, even if no personal benefit is derived from them.

Economic value: Worth to particular people or to society as a whole. Can mean the same as social value and societal value.

Existence value: The value we place on the existence of environmental resources irrespective of human use or engagement with them.

Non-use value: A collective term for Altruistic, Bequest and Existence Value.

Option value: The value of knowing that resources will be available to us in future, even if we don't use them now.

Use value: The value of personal benefits from use of the natural environment. These personal benefits may be direct and indirect, they may be from present use and future use.

A common theme running through all these concepts is the treatment of externalities. These are factors, costs or impacts which are not represented in the prices paid for goods and services. A key difference between economic valuation and conventional valuation and pricing is that economic valuation is concerned to capture and measure the value of externalities, for example, the impact of pollution from manufacturing or farming which may have health effects and require clean-up costs which are external to the market transaction.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Some of the methods used in economic valuation will be more familiar to valuers than others. For example, hedonic pricing features regularly in property and valuation research, and replacement cost is a familiar concept for insurance valuations and specialised assets for which there is no regular market. Economic valuation stresses that price in a market does not necessarily equate to economic value (due to factors like externalities already mentioned).

Methods of environmental valuation can generally be broken down into 3 categories:

Stated preference methods

Revealed preference methods

Value or benefit transfer

Stated preference methods rely on the stated preferences of stakeholders. Two principal approaches are used, firstly, contingent valuation which is an approach that asks respondents direct questions about their willingness to pay for various environmental options. Alternatively, respondents may be asked what price they may be willing to accept for the loss of an option. Secondly, choice modelling, where respondents are asked to choose between options that have different costs. Stated preference methods are particularly preferred for the estimation of non-use values, i.e. altruistic, bequest and existence values, as they are the only methods that allow them to be established.

Revealed preference methods draw on the revealed preference of stakeholders. They include travel cost methods where the value of a site can be assessed by calculating how much visitors have paid on average to access a site and how many visitors the site receives; hedonic pricing where property transaction data are analysed to determine the influence of the factor being valued; avertive behaviour where how much people spend to compensate themselves for the loss of a resource or facility is calculated; replacement cost where the cost of replacing a natural benefit that has or may be lost with a man-made replacement and lastly, direct market valuation, for example, where the value of an ecosystem service can be gauged by the value of the final marketable product to which it gives rise, for example, water for consumption.

Value or benefit transfer is the use of research results from pre-existing primary studies. It is often used to predict welfare estimates such as willingness to pay. Essentially, research results generated at one site or context are extrapolated or transferred to another site or context. These could include predicted quantities such as site visits, commodity demand, elasticities, or the size of affected populations.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Beyond economic valuation, when it comes to the valuation of natural capital we have entered new territory with the development of a plethora of new tools by a number of different stakeholders.

3.3 NATURAL CAPITAL TOOLS

The following is a sample of some additional tools which help to illustrate the variety of approaches and tools available to appraise natural capital.

NCC - natural capital workbook

Firstly, the NCC have a range of publications to assist organisations take a natural capital approach. Of particular importance is the natural capital workbook, a practical guide aimed at anyone who wants to use natural capital approaches in making decisions about the natural environment. It is intended to support decision makers, including planners, communities and landowners, but has particular relevance for place-based decisions. The guide presents a specific method for improving the environment, based on a more general framework for investing in natural capital. The approach of the NCC's guide is to secure the stock of natural capital assets so they can provide a sustainable "flow" of benefits. The guide gives the means to:

Measure the natural capital in a particular area and the benefits it can provide

Identify threats and opportunities to natural capital

Weigh up the available options and opportunities to make improvements

Develop practical plans.

This approach will not result in specific prescriptions, each situation will have its own priorities and opportunities, but the aim of the guide is to provide a structured way of making informed choices.

Department for the Environment, Food and Rural Affairs (Defra)

Defra piloted their first Biodiversity metric in 2012 as part of their biodiversity offsetting pilots. They have now updated that metric and incorporated many of the changes subsequently requested by industry experts.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



The proposed updated Defra Biodiversity Metric is designed to provide ecologists, developers, planners and other interested parties with a means of assessing changes in biodiversity value (losses or gains) brought about by development or changes in land management. The metric is a habitat-based approach to determining a proxy biodiversity value. The metric uses habitat to describe biodiversity, which is converted into measurable “biodiversity units”, according to the area of each type of habitat. The metric scores different habitat types (e.g. woodland, grassland) according to their relative biodiversity values and adjusts this according to the condition and location of the habitat. Where new habitat is created, or existing habitat is enhanced then the associated risks of doing so are factored into the metric. There are 6 key principles for using the metric which are as follows:

The metric does not change policy, or the protection afforded to biodiversity

The metric sits within a decision framework based on the mitigation hierarchy

The metric is a proxy for biodiversity

The metric focuses on widespread species and typical habitats

The metric recognises the importance of place and connectivity

The metric informs decisions.

The biodiversity “value” of a habitat parcel is evaluated on the basis of its area and the relative quality of its habitat. The assessment of quality comprises 4 components which are as follows:

Distinctiveness

Condition

Strategic significance

Habitat connectivity.

The metric operates by applying a score to each of these elements for a habitat parcel. Then a calculation using the score and the area of the habitat gives a number of biodiversity units that represents the biodiversity value of that habitat parcel. The initial calculation determines the baseline or pre-intervention value in biodiversity units.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



The process is then repeated using a post development or post intervention scenario to account for the impact of the development or intervention. At this point, additional factors to account for the risk associated with creating, restoring or enhancing habitats are considered.

The risks are:

Difficulty of creating or restoring a habitat

Temporal risk

Spatial risk.

The relative value in biodiversity units post development is then deducted from the baseline to give a value for the extent of the change. If a net gain is achieved on site there is no need to consider off site measures. However, if the calculation does not result in sufficient net gain in biodiversity units the development proposal can be revisited to improve the number of biodiversity units obtained, or if there is no scope for additional on-site compensation or enhancement, off-site measures will need to be considered.

Green Infrastructure (GI) Tool Kit

This provides a set of calculator tools to assess the value of a green asset or a proposed green investment. Where possible, the benefits of GI are given an economic value. Other quantitative and qualitative contributions can also be provided to give a more complete view of the value of an asset. This tool kit appraises 14 ecosystem services across regulating and cultural categories and incorporates appraisal of the following habitats – urban, semi-natural grasslands, woodland, freshwater, wetlands and flood plains, and enclosed farmland.

The benefits provided by GI are assessed in terms of the function that it may perform, support or encourage. The tool provides insight into key evidence and concepts from a range of sectors including economic development and regeneration, public health and nature conservation. The economic valuation aspect of the tool means it has the potential to translate findings into a business case.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Natural Capital Planning Tool (NCPT)

The NCPT is a tool developed specifically for the planning context and allows for an indicative assessment of ecosystem services over 25 years. It allows the indicative but systematic assessment of the likely impact of proposed plans and development on natural capital and the ecosystem services it provides to people such as recreational opportunities, air quality regulation and climate regulation. Data concerning a development site is input and the tool calculates an Ecosystem Service Impact Score, and a Development Impact Score (overall effect of the proposed development on all ecosystem services). This tool appraises 10 ecosystem services across provisioning, regulating and cultural categories and incorporates appraisal of the following habitats – urban, semi-natural grasslands, woodland, freshwater, wetlands and floodplains, enclosed farmland, coastal margins, mountains, moorland and heaths.

The tool seeks to determine the maximum potential positive outcomes for natural capital from the “Masterplan” stage and for 25 years post development. The Ecosystem Service Impact Score assesses the impact for each service, and these scores combined provide the Development Impact Score. If a proposed development scores negatively, the tool outlines strategies and provides guidance to improve impact on ecosystem services.

The aim is that use of the tool will help not only to better mitigate negative effects of planning and development on the environment, but also to enable planning and development to play a more positive role in the provision and enhancement of multifunctional green infrastructure that works hard for people and wildlife alike – through smart and sustainable design.

Artificial Intelligence for Ecosystem Services (ARIES)

ARIES is a networked collaborative software designed for rapid ecosystem service assessment and valuation. It gives equal emphasis to supply, demand and flow to quantify actual service provision and use by society. It aims to provide a suite of models that support science-based decision-making. 11 ecosystem services are assessed across provisioning, regulating and cultural categories. It incorporates appraisal of the following habits – semi-natural grasslands, woodland, enclosed farmland, freshwater, wetlands and floodplains, mountains, moors and heaths, marine, coastal margins and urban.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



It assesses benefits including carbon sequestration, river and coastal flood regulation, freshwater supply, sediment regulation, fisheries, recreation, aesthetic viewsheds, and open space proximity values.

4. CASE STUDIES

The following three case studies on grasslands, forestry and coral reefs highlight some values and considerations when adopting a natural capital approach.

4.1 CULM GRASSLANDS

RICS “Value of natural capital – the need for chartered surveyors” includes a detailed case study on Culm grassland which is a habitat of international conservation importance. The Culm National Character Area covers 3500 km in the south west UK with the county of Devon supporting over 80% of the remaining Culm grassland found in England. The extent of Culm grassland today represents an 87% loss against 1900 levels. These are marshy grasslands which have traditionally been important for livestock grazing and are very rich in wildlife.

Two separate studies valued aspects of the Culm grasslands. A study in 2012 by eftec found the following:

Cultural, spiritual, landscape and biodiversity benefits were valued at £33 million pa based on a study utilising willingness to pay methods.

Education and research benefits were valued at £27,000 pa based on the travel costs incurred by schools in visiting Culm grasslands.

Climate regulation benefits were assessed at £125,000 pa.

Food and fibre benefits were assessed at £1.2 million pa based on the Higher-Level Stewardship payments.

These annual benefits were capitalised over 10 years to arrive at a value of £282 million for the combined value of these services.

Further calculations were subsequently derived by a team of researchers for the delivery of a range of other services, the details of which can be seen in the RICS paper itself.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



4.2 FOREST ENTERPRISE ENGLAND

RICS has since dedicated a full edition of its Land Journal publication (March / April 2019) to the subject of natural capital and an article in the publication from Miranda Winram of Forest Enterprise England (FE) reproduced here, again, clearly illustrates the different “values” that can be calculated when appraising natural assets.

FE manages the country’s public forest estate – that’s about 252,000 hectares of publicly accessible woodland, 160m trees, 782 scheduled ancient monuments, 110 listed buildings and 30 registered parks or gardens.

The aims at FE are to encourage as many people as possible to enjoy visiting England’s public forest estate, to ensure it is managed to the highest possible environmental standards and to maintain its production of timber for harvest for the UK processing industry.

There’s no doubt that FE provides a valuable service, but, like much of the public sector, this is an intangible benefit with a tangible cost. Reassuringly, this is a modest 45p per adult per annum because FE covers most of its costs through selling timber and income from recreational services, with an annual turnover of £90m.

However, FE still needs to justify the small amount of public funding it gets, and even more importantly, has to ensure that its custodianship leaves the public forests in a better shape than when it inherited them. This is quite tricky – how the value of a red squirrel reserve can be compared and contrasted with the health and well-being benefits of a mountain biking trail? NCA is the tool that helped FE do just that.

NCA is about reaching a total valuation of all the benefits society gets from FE land, such as visits from the public, the amount of biodiversity protected, carbon absorbed by the trees, flood water stored and slowly released, air quality improvements and many more. NCA suggests that all these values can be added up and more easily compare how FE is performing over time – both in totality and in each of the different areas FE deliver benefits.

The difference between NCA and previous ecosystem service approaches to valuation is that the former identifies an asset value; that is, it looks at the benefits generated, subtracts the costs of generating those and then totals that value in perpetuity to create a net asset value.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Essentially this keeps you honest: you can't steal our children's natural capital to benefit today's generation, because if you do, the net natural capital asset value will fall to reflect the future reduction in ecosystem benefits. If the total natural capital asset value changes then FE can use that to ask themselves questions about their land management and how that is affecting the figure, and then make better decisions.

In 2015/16, FE decided that there was value in producing a natural capital account for the whole organisation and has done so every year since: the most recent account, for 2017/18, is available online (bit.ly/FEENCA1718).

As an organisation that is concerned with public benefit, FE feels positive about having a total natural capital asset value to compare with the total asset value produced by financial accounting. Yes, FE knew it was bound to be a bigger figure, but just how much bigger was a surprise: FE's natural capital asset value in the 2017/18 NCA is £23bn, compared to a £2bn financial accounting asset value. This is staggering, particularly given that the account is as yet incomplete.

FE have also learned about the value of repetition. It's complicated doing an NCA, because both the concept and the detail of how organisations get to the data needs fearsome levels of thought and interrogation. FE are unsure whether they will repeat the process every year, but in the first few they have been able to make incremental improvements and embedded the data collection as routine for teams. Every year so far FE have picked up several procedures or technical issues that need updating or amending, and they are sure this will continue.

Public access to the estate has proved to be a highly significant part of the total asset value: at the moment this is calculated at £14bn. Valuing recreational visits in this way puts into context the cost-benefit ratio of providing access to public woodland adjacent to population centres. It boosts the evidence base available for continuing or expanding such provision, despite the comparatively high cost in terms of both capital value and management burden.

There is great value in the detail as well. The basis of the NCA is a register of natural capital assets, and while most of this doesn't feed into the net sterling natural capital asset value, it lists data such as the number of hectares of different types of designated land FE manage. FE have always had some of this information tucked away in their databases, but it's the first time it has been gathered and published annually in an easily comparable way.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Importantly, FE have added a red–amber–green traffic light rating and arrows to the asset register to make it easier to pick out areas where they might be failing and that need more management attention. This also demonstrates the impact of their policies; for example, the increase in open-space habitats to encourage biodiversity. And, as trends emerge over the years, the detail in this asset register will enable good questions to be asked of the FE leadership team – not least whether there are other data sets, such as indicator species audits, that they should be measuring and listing to understand their natural capital impact.

Starting work on the NCA has highlighted the importance to some of other FE evidence-gathering. For example, assessing the number of visitors and how many visits they make to FE's woods has always been a thorny question; FE had already begun a new, consistent way of surveying it but not everyone was convinced it was worthwhile. Needing this data for the NCA gave it additional impetus internally and reinforced the need to reach an agreed methodology for their published visitor numbers.

Creating the account has identified where there are gaps in FE's understanding of how much benefit they provide. This is helping FE give impetus and support to those researching the areas where they are enthusiastic about adding new types of value. For example, FE hope that in the next year they may be able to add one or more values for flood mitigation, water quality and air quality.

So, is NCA an ideal tool for an environmental organisation wanting to assess whether it's doing a good job across a wide range of outcomes? Yes, it is. Like all tools it needs careful handling and the right inputs, but NCA is allowing FE to generate an overall value of the outcomes the public forest estate provides, for the first time. And that, like the natural environment they care for, is priceless.

4.3 CORAL REEFS

A second article from James Spurgeon of Sustain Value in the RICS Land Journal publication (March / April 2019) reproduced here focuses on coral reefs. Coral reefs are arguably one of the most valuable forms of natural capital, certainly in terms of habitat. One estimate puts their value at \$10tr a year, generating annual benefits of around \$350,000/ha. This value derives predominantly from fisheries, tourism and coastal protection, which in turn support considerable real-estate value. In addition, corals support the livelihoods of around 1bn people.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Despite this, over the past 30 years humans have caused the destruction of 50 per cent of the world's coral reefs through overfishing, destructive fishing practices, tourism, pollution and sediment run-off. Together with climate change impacts, losses are predicted to reach up to 90 per cent by 2050. The most recent report from the Intergovernmental Panel on Climate Change (IPCC), Global Warming of 1.5°C (ipcc.ch/sr15), estimates that, with such an increase in temperature, there will be a loss of around 70–90 per cent of corals, with more than 99 per cent loss if warming reaches 2°C. These climate-related impacts will be a result of warmer water increasing coral bleaching and lowering oxygen levels, as well as increased storm damage and acidification. It all makes for rather depressing reading.

These losses will not only threaten the livelihoods of many millions of people, but wipe billions of dollars of value from real estate and tourism activities around the world. Furthermore, their decline will deprive millions of people in the future of marveling at the spectacular underwater scenery and myriad colourful fish and organisms that live among the reefs.

Estimating the monetary worth of benefits that coral reefs provide is at the heart of a natural capital approach. However, such a monetary valuation is far from new, and sadly, seems to have been limited in its effectiveness. Back in 1992, Spurgeon published a paper on the economic value of coral reefs in the *Marine Pollution Bulletin*, highlighting the many and varied benefits of corals and the range of techniques available to calculate their environmental value (bit.ly/Spurgeon92).

Since then, numerous coral valuation studies have been carried out around the world, some of which Spurgeon has been involved in. This includes establishing for example the value of corals for the islands of American Samoa. This was one of the first studies to use geographical information systems to map out the different values, highlighting the locations of greatest coral reef value. A series of focus groups and questionnaires was also carried out with locals and visitors to establish the nature and extent of different values. Typically, such studies help inform enhanced protection of reefs, and sustainable financing for this through additional government funding or the introduction of fees for diving or marine park entrance, for instance.

Over the past few decades, many coral reef damage assessments and associated offsetting studies have also been carried out for ship groundings and a variety of coastal developments. The latter have included power and desalination plants, ports, ferry terminals and cable laying in the Middle East, Florida and beyond. They often involve applying environmental valuation techniques to determine how much compensation should be paid, and to establish how far coral restoration should be implemented.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Some have been part of project finance studies for financial institutions signed up to the Equator Principles (bit.ly/EquPrincs), following International Finance Corporation's performance standard 6. This standard sets out requirements for ecosystem services assessments and biodiversity offsets. The mitigation hierarchy is always followed where practicable, which begins with avoiding damage, then minimising it, then restoration, and finally, if needed, some form of offset, compensation or both. It is not unusual for millions of US dollars to change hands, usually with a view to restoring the damaged corals or investing in some form of related beneficial activity such as management of nearby protected areas or reef monitoring. Valuations and assessments tend to be based on values calculated for other sites – that is, using 'value transfers' – and determining how much additional area should be restored based on habitat equivalency analysis and restoration costs.

These applications have been designed to minimise coral losses at particular sites or compensate for damage to specific corals; the aim for each has been to result in no net loss of corals, although this may not always have been the outcome. Nevertheless, we are continuing to see the relentless destruction of coral reefs throughout the world as a result of a multitude of activities and compounded by unchecked climate change. What is needed is for governments, businesses and the financial sector to adopt a comprehensive natural capital approach, that recognises values, dependencies and systems thinking, and integrates this into decision-making and policy-making.

This is where the NCP can significantly help. In a study for the International Finance Corporation, due to be published this year, the protocol was used to evaluate three alternative management scenarios for Bacuit Bay in Palawan, the Philippines. The study was carried out by Indufor, with technical support from Sustain Value, on behalf of an island resort company, boat tour operators and dive boat operators. These tourism companies all depend on the health and quality of coral reefs, water and fish in the bay. The natural capital assessment revealed that, by jointly managing these shared natural assets in an interconnected land - and seascape, the island resorts, boat and diving operators, local fishermen and local and national governments could all be significantly better off financially in the medium and long term. The financial rewards for all stakeholder groups clearly justified further collaboration and developing a public-private partnership that goes beyond the existing planned management proposed.

Another recent study, funded by the Prince of Wales' International Sustainability Unit, the UN Environment Programme and the International Coral Reef Initiative, also demonstrates how a natural capital approach can provide a compelling financial case for enhanced investment in coral reef management.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



The Coral Reef Economy report, (bit.ly/correefecon), reveals the estimated financial value accruing to tourism, commercial fisheries and coastal developments from coral reef dependencies in the Coral Triangle in South East Asia and the Mesoamerican Reef in the Caribbean.

It highlights that reversing the continuing decline of coral reefs and ensuring a healthy state could unlock tens of billions of dollars in additional value.

The report findings showed that this can be largely achieved through strategic interventions, such as no-take marine protected areas, afforestation, construction of wetland wastewater treatment and improved soil management in farming. Not only do these directly benefit the nearby corals by reducing fishing pressure, pollution and sedimentation, they also help sequester carbon, thereby reducing climate change impacts.

While the prognosis for coral reefs looks bleak, a natural capital approach can certainly play a critical role in demonstrating business and government dependencies on corals, and hence justify the significant actions needed to reverse their decline. Furthermore, natural capital approaches can and must play a pivotal role in tackling climate change. The concept can help shine a light on considerable opportunities for natural capital-based climate mitigation that also generate other valuable benefits such as coral reef protection.

5. INNOVATION AND INVESTMENT

Natural capital can also catalyse new partnerships and foster innovation between financial institutions, land owners, environmental organisations and government. Alongside public sector investment, increased private sector investment into protecting and enhancing natural capital will also be crucial to improving the resilience of natural capital.

Natural capital also presents global investment opportunities for impact investors, a growing asset class. Impact investments have been defined by J.P. Morgan and Rockefeller Foundation as investments; "made into companies, assets, and funds with the intention to generate a measurable, beneficial, social and/or environmental impact alongside a risk adjusted financial return". Many investor buyers are also committing to assets where there are 'investment ready' opportunities that meet impact governance and investor criteria. Natural capital investment also presents opportunities to secure long-term revenue streams for a range of stakeholders.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



It is clear that natural capital evaluation and valuation is relevant from a number of perspectives as follows:

Natural capital is held within land assets owned and managed long-term, by public, private and institutional owners. For many of these there is a will to maximise asset value and preserve and enhance the environmental attributes

Natural capital and ecosystem services unlock a number of commercial opportunities, by way of example, eco-tourism, improved forestry and agricultural practice and sustainability development to rural clients

Asset investors and owners are seeking to quantify, track and report measurable growth of environmental value through a structured and quantifiable approach.

On the investment side the market participants (on both the buy side and owner/operator side) are global and can be classified within the following categories:

Passive investors:

Private wealth to include Ultra High Net Worth individuals (UHNWI's) and Family Offices

Sector focused private equity in environment, climate change, agriculture, forestry etc.

Development Finance Institutions (DFI's) using sovereign aid funds to make a difference

Foundations of private and corporate philanthropists supporting high impact projects

Institutional banks placing finance into Green Bonds, development finance, sector funds

Sovereign Wealth Funds from the Middle East/Asia taking a strategic long-term view

Retail market supported through impact/environment focused crowdfunding platforms

Direct owner/operators:

Private game reserve owners, safari management companies and hospitality businesses

Agricultural investors and agribusiness groups with environmental/social responsibilities

NGO's and non-commercial bodies managing conservation and rural impact projects



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Governments who control and manage game reserves and national parks

Real estate developers with special situation opportunities in rural/wilderness areas.

There will also likely be new classes of assets in the form of environmental goods and services for which valuation will be required as elements which were formally “public goods” begin to offer the potential for economic return to the owners of the underlying assets which give rise to them.

We can expect to see natural capital and ecosystem services represented in a wide range of policy measures including fiscal policy which in turn could become a major consideration in the valuation and management of real estate.

There will be key roles for chartered surveyors and those advising land owners and land managers to identify opportunities, instigate collaboration, bring key parties together, develop markets and put a range of new agreements in place to help realise some of the natural capital values and ensure that land and resources continue to provide vital services across all three pillars of sustainability.

6. CONCLUSION

Financial quantification of the environment is playing an increasingly prominent role in decision making, whether that be decisions concerning development, land use planning, resource allocation or investment by way of some examples. There is a wide market of both public and private conservation and commercial projects who are seeking to quantify the natural capital of their assets not only for management purposes but also for transactional, development and investment purposes. There is a plethora of tools in the market place for the quantification of natural capital and, while this is a welcome development, it has led to some confusion with a number of different approaches developed.

This paper outlines some of the different approaches and methods utilised under conventional valuation techniques versus those available under economic valuation along with some examples of new natural capital tools which can be utilised to calculate values for a range of different factors.

Much like a conventional valuation, it is the purpose here which is key. The question that needs to be posed at the outset is - for what purpose is natural capital being appraised? Once the purpose of the appraisal has been identified the next step is to identify which approach and / or tool is the most suitable for the purpose identified.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



Natural capital valuation must also be based on a clear view at the outset of whether the valuation is simply of what is there, or is it concerned with the value of change? If natural capital is to be accounted for then what is there is important. But if it is various policy and management choices that are being considered, then it is the value of changes, or marginal impacts, that will be most important. This in turn will influence what methods are used to assess the value.

It's very important to note the distinction between the value of an asset as it stands for sale / notional sale, the domain of the valuer utilising conventional valuation techniques, and the evaluation of an asset for strategic decision-making purposes for its deemed or perceived benefits / dis-benefits associated with its existence, enjoyment, environmental or aesthetic contribution. While the deemed or perceived benefits of some assets may translate into part of a sale / notional sale, others will not. The most important point to note is that there may — and usually will — be wide divergence between figures provided on these fundamentally different bases.

Users of values will need to have a clear understanding of what has been calculated, for what purpose and what valuation approaches and tools have been utilised to arrive at the derived values so that stakeholders do not find themselves talking at cross purposes.



Catalyzing Innovation

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 25-29, 2019



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