Insight

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Value of natural capital – the need for chartered surveyors

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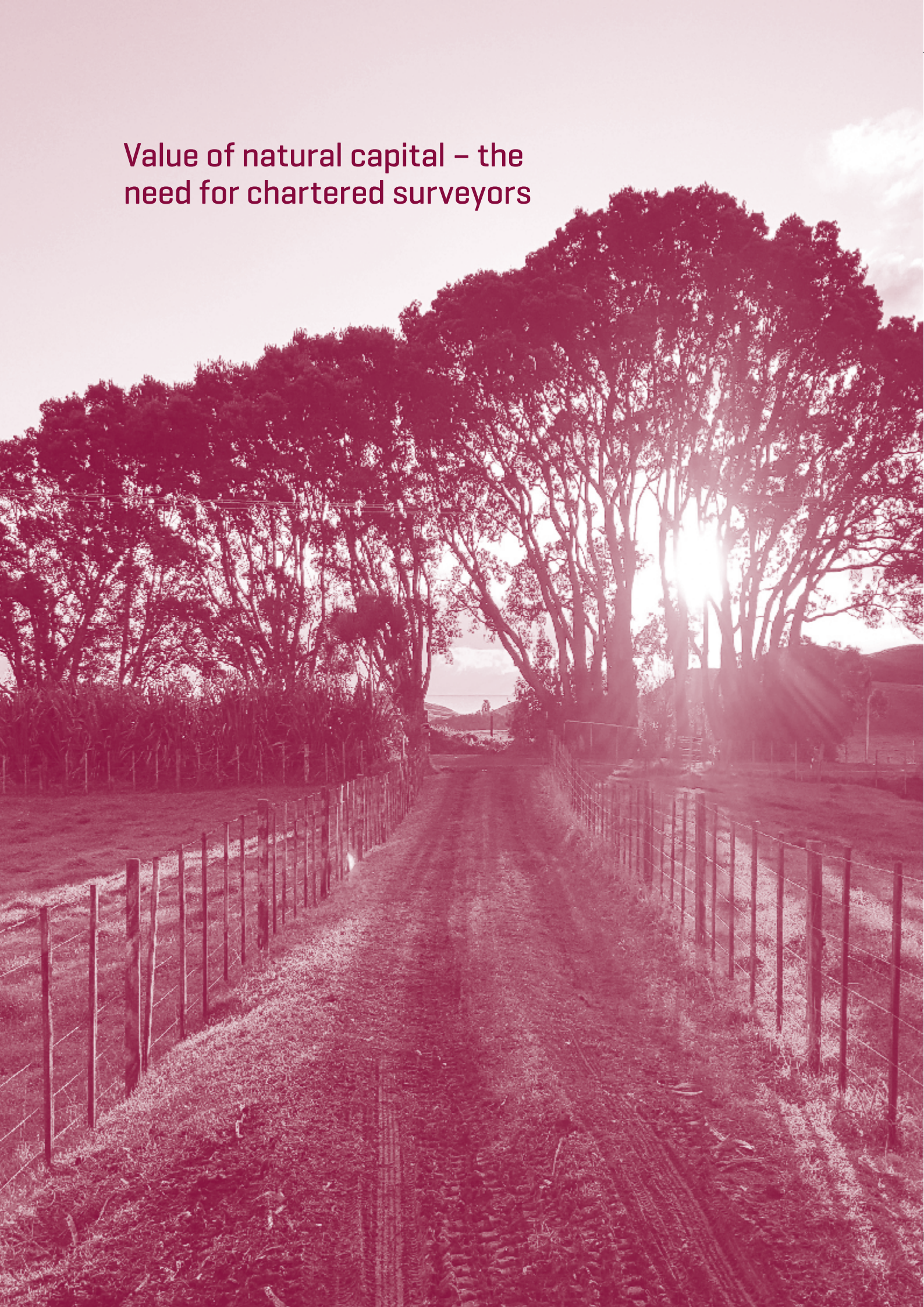

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Foreword

The first paper from RICS on the subject of ecosystem services Challenges for international professional practice: from market value to natural value outlined 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. Since publication of the paper there has been a plethora of publications and initiatives on the subject from the government and a range of stakeholders.

Value of natural capital – the need for chartered surveyors develops RICS thinking on the topic of ecosystem services. While this paper outlines examples that involve grasslands and woodlands, the approaches involved can be applied across a range of natural assets. It's important to note the distinction between the value of an asset as it stands for sale/notional sale 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 value, others will not.

From a natural asset perspective, the management of water has considerable potential for development from a number of perspectives. The report from Green Alliance, in partnership with the National Trust, *New markets for land and nature* outlines how Natural Infrastructure Schemes could pay for a better environment and proposes a new payment mechanism that establishes natural markets to bring new income streams into farming.

It makes recommendations for how government, alongside private endeavour, could accelerate the creation of these viable markets for ecosystem services. Green Alliance work with the National Trust continues. They are working with partners to develop the concept and trial on the ground. RICS is a collaborator on this initiative alongside other industry stakeholders.

Another particular initiative in the natural capital arena to note is the emergence of the concept of Corporate Natural Capital Accounting (CNCA). CNCA enables organisations to gather information on natural capital in a coherent and comparable format to aid decision making concerning the management of natural assets, to the benefit of the organisation and society. It's important to note the distinction between CNCA and financial accounting and the distinctions between the values attributed to natural assets in corporate natural capital accounts versus those in an organisations financial set of accounts.

RICS encourages all chartered surveyors engaged with land and natural resources in any capacity to familiarise themselves with this paper and other relevant industry publications and stay abreast of developments in the ecosystems services arena as they emerge and evolve.

RICS Land Group

1.0 Introduction

This insight paper reviews the broad topic of environmental valuation from the perspective of a practising valuer, land manager or estate manager.

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 that 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 Fair Value, Investment Value and Worth. 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. Where is the evidence other concepts and methods have been tested and proved in a real market place, that there are willing buyers and sellers on the terms envisaged who could fund and enter the transactions that must be envisaged?

Yet valuers are often required to provide a hypothetical value, for example, the value of an interest in an unassignable traditional agricultural tenancy for tax or other purposes. The law on tax valuations evolved through the twentieth century to devise the conceptual or hypothetical 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 that are more remote from the market place of day to day transactions.

This paper approaches the field of economic valuation of the environment from a professional valuation

Kinder Scout, Peak District (iconic Peak District landscape, suffers heavy erosion from Pennine Way and extensive restoration and remediation work undertaken © Charles Cowap

perspective. That is to say, the language and approaches of environmental valuation are presented in such a way as 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 as the case may be) market contexts. Naturally, particular care is required to ensure that clients fully understand the nature of the advice being provided, and that there may – and usually will – be wide divergence between figures provided on these fundamentally different bases.

Property valuers are familiar with a five-stage process to their work:

1. Instructions are taken and terms of engagement agreed, which includes the agreement of a basis of value. This is normally market value but other bases are growing in their importance. The purpose and date of the valuation is also agreed. If, in exceptional circumstances, the client will not disclose the purpose of the valuation, special steps are taken to deal with this unusual occurrence. There must always be a valuation date for a valuation to have any validity.
2. A site inspection is undertaken and all available information is carefully reviewed (planning history and status, tenancy details, market comparables and so on).
3. A valuation method is chosen and applied, based on the purpose of the valuation, the nature of the property and the available evidence. This leads to the production of a final figure for the value of the interest on the chosen basis of value.
4. A report is prepared that comprehensively summarises the instructions or terms of reference, the investigations undertaken, the nature of the property itself and the interest being valued, a commentary on market conditions and data and of course, the reported valuation itself. The instructions will have made clear the intended users and availability of the report, and this information will also be repeated in the report itself.
5. Follow-up inquiries will be addressed including on occasion an instruction to revisit the valuation and update it for changes in market conditions since the original valuation date.

This is no more than the briefest summary of the professional procedure by which a valuation is produced. There is much more to be considered. Procedurally, the *RICS Valuation – Professional Standards* (Red Book) covers many of the requirements. Technically, other matters such as measuring conventions, the analysis of comparables, and the choice and application of valuation methods are covered in other RICS guidance and a long-established bibliography of property valuation literature.

Before looking more closely at the principles that underline environmental valuation approaches, it may be helpful to present some examples in which chartered surveyors and registered valuers have already been involved.

2.0 Examples from practice

The first example concerns a valuation of the Culm Grasslands in Devon. The valuation work was undertaken by Charles Cowap, the primary author of this paper.

Culm Grasslands, Devon

Devon Wildlife Trust has been restoring the Culm grasslands of northern Devon since the early 1990s. Culm grassland is characterised by being a wet and tussocky semi-natural grassland. To quote from the introduction to the final report on the valuation project:

"Culm grassland (purple moor grass and rush pasture) is a habitat of international conservation importance. These marshy grasslands, wet and tussocky in character, have traditionally been important for livestock grazing and are very rich in wildlife. The Culm National Character Area (NCA) covers 3500 km in the south west UK, with Devon supporting over 80% of the remaining Culm grassland found in England. The extent of Culm grassland today indicates a loss of 87% against 1900 levels. This loss is primarily due to agricultural improvement by drainage and the use of modern grass species in order to develop intensively managed grassland (IMG), capable of carrying more livestock or supporting forage production for longer periods. In some cases this has allowed milk production to take the place of beef rearing for example. In other areas the traditional grasslands have been undergrazed or not grazed at all, allowing scrub to encroach.

The recognition, conservation and enhancement of Culm grassland is a high priority for Devon Wildlife Trust. Since 2008 the Trust's Working Wetlands project has worked with landowners to manage, restore and recreate Culm grassland. More recently this work has been augmented by the delivery of the Northern Devon Nature Improvement Area (2012-2015). At the time of the University of Exeter review on which this work is based, a total of 3,984 ha of Culm grassland has been restored or recreated."

The economic value of ecosystem services provided by Culm grasslands, by Charles Cowap, Susan Warren, Alan Puttock, Richard Brazier and Mark Elliott

The 2015 report sought to place a value on the water and carbon benefits associated with these traditional grasslands, particularly by comparison with the intensively managed grassland which a large part of the original culm area had become by the start of the 21st century. Considerable monitoring work had already been undertaken by Exeter University, and the Culm grasslands had already been the topic of an earlier ecosystem services valuation by eftec (Economics for the Environment Consultancy). See Valuing Ecosystem Services: Case Studies from Lowland England, Annex 6 – Reconnecting the Culm project: Devon.

Culm Grassland at Speccott Moor, Devon (Devon Wildlife Trust). The complex structure of this habitat, which is found across mid and north Devon, helps alleviate flooding and enhance water quality – both recognised and valuable ecosystem services.

The earlier 2012 eftec report had valued the following aspects of the Culm grasslands:

- Cultural, spiritual, landscape and biodiversity benefits. This valuation of £33 million pa had been derived from a study based on respondents' willingness to pay for these benefits. This and the other approaches mentioned here are described more fully later in this paper.
- Education and research benefits were valued at £27,000 pa, based on the travel costs incurred by schools in visiting Culm grasslands – a Travel Cost Method.
- Climate regulation benefits were assessed at £125,000 pa.
- Food and fibre benefits were assessed at £1.2 million pa based on Higher Level Stewardship payments. These were taken as a proxy for the Opportunity Cost of not intensifying the management of traditional Culm grasslands.
- These annual values were capitalised over 10 years to arrive at a value of £282 million for the combined value of these services.

This study did not, however, assess the value of the following benefits associated with traditional Culm grasslands:

- The capture and storage of carbon.
- Reduced levels of nitrogen and phosphates in soil.
- Water storage.
- Reduced loads of suspended sediment in water.

Since the eftec study, considerable research has been undertaken at Exeter University to assess these benefits in physical terms. The challenge for this valuation was to place a financial value on the scientific findings.

Initial questions were concerned with determining what exactly was being valued. In particular, ecosystem service valuation must be based on a clear view as to whether the valuation is simply of 'what is there', or is it concerned with assessing the value of change? If we are to account for natural capital, the value of what is there will be important. But if we are looking at various policy or management choices, the value of changes – or marginal impacts – will be more important. In turn, this will influence what methods are used to assess the value.

It was decided that it would be useful to consider:

- The value of the present contribution of the Culm grasslands.
- The value of the restoration work undertaken by Devon Wildlife Trust.
- The potential value of restoring Culm grasslands to their 1900 levels (or put another way what might have been lost since 1900 in current value terms).
- The value of carbon and water benefits within a particular defined catchment area of a reservoir.
- A comparative valuation of the Culm grassland compared with Intensively Managed Grassland (IMG).

This meant that what was of concern was the 3,926 ha estimated to be the remaining Culm, the 3,984 ha of grassland restored by Devon Wildlife Trust, and the 132 ha of Culm that remain in the Roadford Reservoir catchment area compared with the 455 ha estimated to have existed in 1947. This is within the catchment area for the River Wolf.

The research data had been presented in a number of different numerical forms. Water storage, for example, was expressed in litres per square metre while topsoil was measured in depth in centimetres and carbon storage in grammes per square centimetre. The conversions showed that Culm water storage amounted to 2,770 m^3/ha compared with only 610 m^3 in intensively managed grassland. Topsoil on the Culm grasslands was 20 cm deeper, providing an additional 2,700 m^3/ha while the carbon differences were less – 180 m^3/ha compared with 150.

Green Haying (Devon Wildlife Trust). This process involves bringing freshly cut hay from a species-rich site (which still holds all its seed) and spreading it onto a restoration site – a successful method Devon Wildlife Trust uses to restore large culm grasslands.

The carbon benefits were valued according to their 'shadow price', which is a relatively straightforward process once the physical quantities of carbon have been ascertained. The detailed hydrology of the study area was understood, but the available financial data did not match this level of detail.

Various figure were available from other studies. For example, the UK National Ecosystem Assessment had placed a value of raw water in the environment of 5p/m^3 while it was known from other work with South West Water (the local water utility provider) that the trading value of water in its reservoirs could be as high as 25p/m^3. Values were therefore adopted for the water in the Culm grassland towards the lower end of this range, for reasons more fully explained in the Culm Grassland Proof of Concept Study, and they were differentiated according to where the water lay in a catchment. Water within the catchment of the reservoir was allocated a higher value because of its utility. These figures were taken as reflecting the composite value of the various benefits arising from the hydrology of the Culm grassland, i.e. reduced phosphate and nitrogen, reduced sediment, water availability.

Carbon shadow values already represent a capital value, whereas the water values used were the annual value for the water benefits. The capitalisation rate chosen was based on HM Treasury's discount rate, often a default choice for ecosystem service valuations where the discount rate is regularly described as the 'social discount rate'. The resultant valuations are very sensitive to the rate chosen, like any appraisal of Net Present Value using discounted cash flow techniques. Some environmental economists go so far as to argue that social discount rates should be below zero, i.e. negative rates of interest. The effect of this is to increase a future value when it is 'discounted' to its present value today, perhaps reflecting the price we should be willing to place on ensuring that a functioning natural asset is preserved given the likely consequences of its loss.

The calculations resulted in a total value/ha for Culm grassland feeding the public water supply of £12,197/ha compared with IMG of £9,656, and lower values for the two assets when they were less proximate to the public water supply. The 'headline' figures from this work were:

- The loss of water and carbon values from Culm grassland converted to IMG since 1900 was estimated to be £32.2 million.
- The potential value of the restoration work undertaken by Devon Wildlife Trust for its carbon and water benefits would be £9.139 million once it comes to fruition.
- The remaining area of Culm grassland has a value for water and carbon of £35.46 million, which is £9 million more than if it had been lost to IMG.

What does this study illustrate in regard to valuation professional practice? Firstly, it involved very different bases of value, different methodologies and a wider tolerance regarding the final reported values. Secondly, it involved the production of values for different purposes from a conventional property valuation. These include the provision of a financial basis for future policy decisions, and for the allocation of scarce funds that will not earn conventional 'market' returns. This is part of a much wider story: that the environment will not be taken seriously enough until it is properly costed. Financial valuation of the environment is very likely to take an increasingly prominent role in development decision-making, land use planning, resource allocation and corporate accounting. The second case study on the next page illustrates some more aspects of this.

Natural Resource Valuations for Natural Resources Wales: a tale of two woods

This study has been contributed by Mari Sibley MRICS, Principal Surveyor, Natural Resources Wales who undertook the work described here.

Gethin Forest is an established upland conifer plantation largely planted in the latter half of the 1950s and early 1960s. It stretches over 1,368 hectares, of which 1,008 hectares is afforested.

Gethin Forest showing mountain bike infrastructure (taken by Gareth Roberts of NRW)

Coetir Ysbrid y Llynfi ('Llynfi') is the newest addition to the public forest estate in Wales. It was planted by Natural Resources Wales in November 2015 on the site of the former Coegnant Colliery and Maesteg washery site in Maesteg, adjacent to the communities of Nantyfyllon, Caerau and Maesteg in South Wales.

It is the first woodland planted by Natural Resources Wales since the previous body responsible for management of the public forest estate in Wales, Forestry Commission Wales, was merged with the other rural agencies to form Natural Resources Wales.

It consists of 20ha of new planting and improvement of an existing 10 ha to create a new 30 ha woodland within the 78 hectare site.

The two woodlands were planted for very different reasons. Coetir Ysbrid y Llynfi was funded by the Welsh Assembly Government's Nature Fund, to realise multiple benefits. This was conceived from the outset as a woodland project that would generate a range of ecosystem services. These were determined according to local social needs. The site was a former colliery waste site, the colliery itself having been the main source of employment and income to many families in the immediate area as well as having claimed many local lives over its years of operation.

Community orchard planting as part of the Llynfi Woodland Creation project (taken by Mari Sibley)

A traditional valuation of Gethin Forest would focus on the products derived from it that can be sold in the market, usually the timber crop. In addition, the value of minerals contained in the woodland, such as stone, may also be valued. The net present value of a 50-year forecast for these products is £4,544,645 for timber and £322,102 for minerals. It is important to note that there are significant downstream benefits resulting from the sale of timber from the Welsh Government Woodland Estate. Forest industry multipliers provide evidence that for every hectare of timber sold from the estate, an additional £2,000 is generated by the timber supply chain. In addition, there are between 8,000 and 11,000 people employed in the forestry industry in Wales.

Notwithstanding the importance of continuing to measure the valuable contribution to the Welsh economy of timber production and marketing, an ecosystem services valuation seeks to recognise, chart and value the other benefits provided by the woodland. In this case study, values are also provided for the contribution the woodland makes to climate regulation and to recreation and health.

The way in which Gethin contributes to climate regulation has been assessed by examining and valuing three ecosystem services:

1. contribution to carbon sequestration;
2. air quality; and
3. water quantity.

Gethin has 17% broadleaf planting and 83% conifer planting. The amount of carbon stored in the woodland was assessed using UK Woodland Carbon Code figures and then valued using the Department of Energy and Climate Change scale for carbon pricing and discounted, using the 3.5% rate suggested by Treasury guidance, over the next 50 years to give a net present value of circa £17 million. This sum represents the value to society of being able to keep carbon sequestered in the woodland and not having to find a replacement way of storing that amount of carbon.

Numerous studies have concluded that trees and woodlands positively contribute to air quality and human health. Separate studies suggested a figure of £240 per hectare for savings in treatment and damage caused by particulates and sulphur dioxide. Forest Research's i-trees project concluded that trees in the Tawe area provided benefits of £750 per hectare of tree planting. The lower figure of £240 per hectare has been used to calculate the value of the contribution Gethin makes to air quality but it should be noted that the woodland is adjacent to the A470, which is one of the 'red' areas in Wales for particulate emissions, so the value may be higher. Using a 3.5% discount rate, the net present value for the contribution of the woodland to air quality and health treatment cost saving is £6,160,565.

Turning to water, trees take up water and intercept surface run-off flows. Recent research projects at Pickering and Pont Bren have proven the value of trees to assist hard defences in flood alleviation. The Pont Bren trials undertaken by Imperial College, London offer a range of

figures of extra take up of surface water but the dangers of extracting value from limited data is recognised and no value has been attributed to this ecosystem service as a result. A research project specifically aimed at measuring the uptake of water and the impact on flooding of an upland woodland such as Gethin is currently in design phase.

On average, 60,000 visits to Gethin are made annually. This is a combination of visits to a commercial recreation business that operates in the woodland and visits for informal recreation as diverse as dog walking, orienteering and running.

Each visit is valued at sums ranging from 40p up to £2.17, which is the willingness to pay (WTP) figure provided by Forest Research after extensive research into the value of each recreation visit to the public forest estate. This is the sum members of the public are willing to pay to enjoy informal recreation that benefits their health and sense of well-being. The discount rate used to achieve a net present value was 3.5%.

In addition, Natural Resources Wales receives a commercial lease payment from the commercial recreation operator. This commercial element has been discounted by 7% to reflect the greater risk of securing the income from a third party commercial business.

The net present value of the recreation in the woodland, both commercial and informal, is over £3,000,000.

Furthermore, the commercial recreation enterprise has created over 20 new full-time jobs over the past 3 years.

The community in which the Coegnant Colliery and Maesteg Washery site is located is within the 10% most deprived wards for health in Wales. Healthy life expectancy in some wards in the area can be around 20 years less than the national average; 19.4 and 21 years for men and women respectively due to high levels of heart, respiratory and circulatory disease and cancer.

The valley was a coal mining area with its last pit closing in 1985. Several other large employers have also left the area. This industrial decline has resulted in relatively higher levels of unemployment, illness, and other aspects of deprivation.

In order to address these problems the NHS established a project group called Llynfi20 which used a method called the Asset Benefit Community Development approach. This approach places a premium on green space. The group's input was combined with the expertise of the local authority and work with the local community to produce a landscape design master plan.

The Local Authority wanted to see biodiversity improvement through woodland creation and connectivity as the recent Bridgend Green Infrastructure Strategy recognises the potential to reconnect woodlands both along the Llynfi Valley, and between Afan, Llynfi and Garw Valley. Broadleaf planting has improved and extended habitats and the extension of existing ponds on site will provide wetland areas. The improvement of biodiversity as a result of these measures is being monitored and recorded in partnership with Swansea University.

Environment benefits in the form of 'regulating' ecosystem services will be provided through:

- Sequestration of carbon by the 30 hectares of broadleaf woodland. 10,500 tonnes of carbon will be sequestered over the lifetime of the woodland, making a valuable contribution to carbon reduction targets and climate change mitigation.
- Improvement in water management. The planting scheme will improve the current surface water run-off issues at the site. A primary area of work was ripping the compacted mine waste and incorporating 80,000 tonnes of green compost. As the site is primarily a compacted colliery tip, water runs across the surface of the site during high rainfall, and has caused a small landslide of spoil. A reduction in the surface water and its associated problems can already be seen on the site due to the increased water take up by the new trees and reduction in compaction.
- Improvement in air quality. Air quality is expected to improve in the Llynfi valley due to the planting. The Llynfi20 NHS working group record that residents in the Llynfi Valley experience higher rates of respiratory health issues.

Cultural services for the community are secured by the woodland in the following ways:

- The regeneration of a previously developed industrial site positively contributing to the landscape within the Llynfi Valley, which is a key objective of the Bridgend Landscape Strategy.
- Through the promotion of health and well-being by providing attractive green space and supporting the National Health Service health agenda. The woodland was planted around a designed network of paths that vary in length and gradient to enable exercise on prescription by local general practice doctors.
- Promotion of community cohesion and ownership by extensive community consultation to secure the involvement of local communities in initial design of the woodland, naming competition, planting and open days and a community-led steering group.
- Offering education and research opportunities by encouraging the involvement of local schools in the development of the scheme. Due to the proximity of Maesteg Comprehensive School to the site, the teaching staff at the school are keen to develop both curriculum and alternative education opportunities using the site. The site also affords research opportunities to Swansea University students and Natural Resources Wales itself.

Ford Motors, based nearby at Bridgend, emerged as the strongest potential private sector partner in this project. Although the company did not need to secure any more carbon benefits, local staff had become intrigued by the idea of the Bridgend plant supporting a scheme that provided healthy green space for a community that was home to a large number of them. After sustained negotiation Ford Motors agreed to provide 10 years of significant financial and practical support to the project, in exchange for the provision of ecosystem services of green space and environmental improvement for their employees and community.

The first planting work at Llynfi took place in November 2015 in National Tree Week and Mark Thomas, Ford's sustainability manager made a speech in which he said:

"Why has Ford been so keen to be involved in a project like this? When you think about sustainability for Ford, it's not just sustainability in the products we make or the plants we run, it's about the communities in which we operate. Our plant in Bridgend has 1800 employees and over 300 live in the communities of the Llynfi Valley so this project is something that is really close to the hearts of our employees."

The example provided by Ford Motors at Llynfi shows that payments for ecosystem services can be generated in unexpected ways. The initial negotiations around carbon credits broadened into support for green space and environmental enhancement to benefit a community. It has quite unexpectedly transpired that the sale of carbon credits from the woodland will be a second opportunity to attract PES rather than the first.

When the valuation techniques applied to Gethin Woodland are applied to Coetir y Llynfi a valuation of approximately £900,000 is achieved for the carbon sequestration and improvement in air quality benefits alone. As ecosystem valuation techniques evolve, and valuation is enabled of the other benefits listed above, that total will grow to include the benefits generated from biodiversity, water quantity and quality and health and well-being improvements.

Both of these case studies were led by chartered surveyors. They will now be used to illustrate the process of environmental valuation in relation to an overview of property valuation procedures.

3.0 Instructions, purpose and basis of valuation

All valuation and appraisal work is undertaken for a purpose and the economic valuation of the environment is no exception. Society has come to realise with growing clarity there are costs and benefits that are not reflected in shorter-term financial appraisals and valuations.

Economic valuation seeks to capture these wider values and place them on a common financial footing to allow direct comparison. The most common applications of economic valuation are therefore likely to be concerned with strategic policy decisions, particularly in the field of land use and development.

At a more local level, a full economic valuation of costs and benefits may help asset managers to promote the value of key assets in which they have an interest, drawing out the value of wider benefits or liabilities in ways that would not be possible in a conventional financial appraisal or valuation. These aspects will normally be clear from an economic valuation report, having been established at the outset. In this respect an economic valuation is little different from a conventional property valuation and practitioners in both fields would emphasise the paramount importance of ensuring that instructions or terms of reference are as clear as possible from the outset.

In particular, economic valuation emphasises a three-stage approach:

1. the nature of the decision to be made is determined, and in particular the way in which the proposed action will influence the environment;
2. changes in the environment need to be specified, in terms of both negative and positive changes; and
3. finally, monetary valuation of the changes can be undertaken.

This sequence recognises that traditionally the process of economic valuation has been more concerned with the value of change. However, more recently the idea of natural capital valuation has also become concerned with the total value of an environmental resource, and this is being reflected more and more in national and other accounts.

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

Scientific monitoring equipment on Exmoor © Charles Cowap

4.0 Economic valuation: value concept = basis of value

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.

Total economic value: Portmanteau phrase to characterise and value the benefits that people receive from the environment.

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 that 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 with capturing and measuring the value of externalities, for example, the impact of pollution from manufacturing or farming, which may have health effects and require clean-up costs that are external to the market transaction.

A helpful introduction to some of these concepts has been provided in Demystifying Economic Valuation: Key Paper published in 2016 by the Valuing Nature Programme.

5.0 Site appraisal and collation/review of information

Whereas a conventional property valuation may be primarily concerned with comparable market data, lease terms, planning assumptions and so forth, an economic valuation may call for the collation of a significant amount of underpinning scientific data.

At least some of the scientific data may be based on primary research into gaseous exchange mechanisms in soil, hydrology and biodiversity. Both conventional property valuations and economic valuations must describe the asset or resource under consideration very carefully and clearly.

The Culm grassland case study exemplifies this use of underpinning scientific data, the importance of understanding it and making it useable for financial appraisal purposes.

Water overflowing from Wimbleball Reservoir, Somerset © Charles Cowap

6.0 Valuation method

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).

As for property valuation, the choice of method will, to some extent, be conditioned by the definition of value and the purpose of the valuation itself. The remainder of this section summarises some of the key methods and terms used in economic valuation.

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

1. stated preference methods
2. revealed preference methods; and
3. value or benefit transfer.

Of these three, the first two methods (stated and revealed preference) will generally require primary research to be undertaken. The latter method, value or benefit transfer, relies far less on primary research but may require substantial judgment to adapt values from one site to another – in this respect it is not unlike conventional valuation by direct comparison. The two case studies in section 2 both relied on value transfer approaches to a considerable extent.

Stated preference methods

As the name implies, these methods rely on the stated preferences of stakeholders. These may be drawn from a key group (e.g. divers or fishermen if you wish to value coastal waters), or from a more general population. Two principal approaches are used:

1. **Contingent valuation:** an approach that asks respondents direct questions about their willingness to pay (WTP) for various environmental options. Alternatively, respondents may be asked what price they would be willing to accept (WTA) for the loss of an option. The eftec study of the Culm grasslands explored in section 2 used WTA in some respects to measure the 'value' of food and fibre output, in that HLS payments were the sum that farmers were willing to accept to forgo these activities (see also further comment below concerning avertive expenditure). Contingent valuation has not always enjoyed a good press, and it is important that samples are large enough to give meaningful results, the choices are placed in an appropriate context and respondents are carefully reminded that their own financial resources are limited.
2. **Choice modelling:** often done in focus groups (**group approaches**). When the approach can be described as **deliberative**, respondents are asked to choose between options that have different costs. Group and deliberative approaches are not exclusive to choice modelling.

Contingent valuation and choice modelling can be combined in the same survey or project.

Stated preferred 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

In contrast to stated preference methods, these methods draw on the revealed preferences of stakeholders. They include:

Travel cost methods: the value of a site to its visitors for example, can be assessed by calculating how much they have paid on average to reach the site and how many visitors the site receives. Again, well-designed surveys are used to elicit this information. The NRW case study outlined in section 2 drew on well-developed data from Forest Research in arriving at the value of one of the woods by this method. This method had also been used in the earlier eftec study of the Culm grasslands in section 2, by looking at the costs incurred for school visits.

Hedonic pricing: property transaction data are analysed to determine the influence of the factor being valued, for example proximity to open space or location in a National Park. This relies on having sufficient data to produce a robust analysis.

Avertive expenditure (also avertive behaviour method): how much people spend to compensate themselves for the loss of a resource or facility. Bottled water in preference to piped water is sometimes quoted as an example. Care is needed that not all the extra expenditure is necessarily due to the requirement for compensation. For example, the avertive behaviour associated with living in a dismal environment may consist of lots of visits to country parks, but some of those visits might have happened anyway simply due to the pleasure of visiting the park rather than to escape the dismal environment at home. This also demonstrates the need to be very cautious about double counting in economic valuation. For example, hedonic pricing to isolate the differences in property prices due to a

poorer environment, avertive expenditure to measure the compensation sought by occasional release and travel cost methods to place a value on the places visited instead. There are some elements of this approach in the adoption by eftec of HLS payments as a proxy for the agricultural output of the Culm grasslands, although its use for that purpose may be debateable (see also the previous comments concerning willingness to accept as a contingent valuation approach with regard to the HLS payments).

Replacement cost: the cost of replacing a natural benefit that has or may be lost with a man-made replacement. For example, the cost of water treatment to deal with peat degradation following drainage might represent the minimum 'value' of the original environment that has been lost or may be lost. This method illustrates the dangers of a common language as replacement cost, and in particular depreciated replacement cost, would also be a familiar method to property valuers but in a different guise – the replacement of like with broadly like rather than with a substitute.

Direct market valuation: these approaches can be based on transactional data, production costs or replacement costs. This can be extended to the cost of avoiding damage to an ecosystem, or the cost of replacing a damaged or destroyed service. This extends to production function based approaches where, for example, 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). Indirectly the Culm grassland study had regard to the final value of water to consumers although much lower values were used in view of the location of the water being valued in the water cycle, i.e. before treatment and storage costs had been incurred.

Value Transfer/Benefit Transfer

The approaches so far may be said to result in 'primary' valuation studies (after *Valuing ecosystem services, Methodological Issues and Case Studies* by KN Ninan, 2014) but the practical reality for many appraisers is that such studies are neither feasible nor affordable. Benefit Transfer (BT – also sometimes known as Value Transfer) can overcome these difficulties by transferring the values found in a primary study taken elsewhere. However, the danger of BT is the extent of the similarity between sites in terms of place, time and services under review. Important differences can arise in terms of socio-economic characteristics as well as environmental and ecological conditions. Scale can also be very important, with the marginal value of changes between say a large site and a small site often lacking certainty and predictability.

Despite the veneer of sophistication worn by a number of the approaches outlined here, the end result is often likely to be approximate within broad parameters; a rough and ready appraisal.

The fact that an appraisal may be rough and ready does not however necessarily detract from its value in the management of particular ecosystems and sites. However, this view would trouble a property valuer faced with similar parameters of doubt. Sensitivity analysis can be an answer to this concern in both situations, and is perhaps more likely to be encountered in economic or ecosystem service valuations than in conventional property valuations.

Value or benefit transfer draws on already-published valuation studies. In this respect it can be loosely seen as akin to the comparable method of valuation in that a similar valuation is adapted to the circumstances under consideration. It is the only valuation method so far that does not require the collection and analysis of primary research data.

In practice, BT is likely to be encountered more widely than primary studies, and our two case studies demonstrate its application and to some extent its pitfalls in section 2. For example, the valuation of the Culm grasslands drew on scientific research that was specific to the Culm, but that research was no more than a proof of concept based on a small number of sample plots. They were taken to be representative of the Culm grasslands as a whole – and had been designed to be so – but much wider replication would be desirable to ensure this. The Welsh woodlands study relied on the extensive work by Forest Research to establish an average value per visitor, but that value was derived from research across a number of different forests in different locations. There may be specific features of the Gethin Forest that mean this value should be adjusted up or down. Similar considerations apply with the value chosen for water on the Culm grasslands.

Having briefly introduced the bases and concepts of value in terms that might be more recognisable by valuers, it may be helpful to expand the discussion of ecosystem service valuations in the light of Defra's Impact Pathway Approach.

7.0 Defra guidance on the valuation of ecosystem services

The classification of ecosystem services is now the predominant way in which the benefits we derive from nature are categorised. Broadly, ecosystem services are grouped into provisioning services (e.g. food and timber production), supporting services (e.g. pollination), regulating services (e.g. the carbon cycle) and cultural services (e.g. recreational benefits from nature). These services and categories have been mentioned several times in this paper already, and while the language of ecosystem services is gradually becoming more commonplace in the mainstream, it is nevertheless still often greeted with scepticism by those unfamiliar with the concepts (and indeed by some who are familiar with them). Nevertheless, this is becoming the increasingly dominant language of how we discuss the environment in policy and management terms and there is effectively no choice for practitioners other than to come to terms with it.

An introductory guide to the valuation of ecosystem services (Defra 2007) points out that the purpose of such valuations is to ascertain policy and environmental impact. The objective is to value changes in services provided by the natural environment under various policy or development options in terms of economic welfare. Economic welfare is broadly divided into two elements: first the generation of income and wellbeing, and secondly the prevention of damage that inflicts 'costs' on society.

Defra advocates an Impact Pathway Approach in which there are five key steps:

1. Establish an environmental baseline.
2. Identify and provide a qualitative assessment of the potential impacts of the policy options on ecosystem services.
3. Quantify those impacts.
4. Assess the effects on human welfare.
5. Value the changes in ecosystem service provision.

Defra looks to a Total Economic Valuation (TEV) framework for the identification of various methodologies that may be relevant. TEV considers both use and non-use values. Non-use values encompass the value that individuals (and therefore society) place on the mere existence of an asset or service, and these incorporate notions of altruism and bequest values in being able to leave an asset or service for future beneficiaries. For example, many of us may never have the opportunity to see a Blue Whale but we nevertheless 'value' the knowledge that they are present now and will continue to exist in the future. Use values can be based on actual and planned uses, both direct and indirect. Use values can also draw on option values – the 'cost' of forgoing an alternative. These approaches have already been described in section 6.

In *Valuing ecosystem services, Methodological Issues and Case Studies*, Ninan drew together a number of individual studies to demonstrate the methodological issues and challenges and illustrated these with a number of valuation, and valuation and policy, case studies. One of the more relevant of these studies concerns the economic value of ecosystem services from agricultural and rural landscapes in Japan (Yoshida 2014). Despite its relevance in principle, the difficulties of transferring the benefits of a study based on paddy field management and enumerated in Japanese Yen to the situation of traditional UK grasslands on the other side of the world for example, are formidable. At its simplest, the difficulties of ESS valuation are illustrated by some of the seemingly 'silly' results that seem to emerge from various studies in terms of their relationship to GDP and other economic measures. A consistent theme, however, is the need for caution over 'double-counting'.

8.0 Natural Capital Accounting

The Defra Impact Pathway Approach emphasises the value of change. Natural Capital Accounting by contrast seeks to value what is there. This is an approach that has been gathering considerable momentum in recent years, particularly since the formation of the Natural Capital Committee to advise the UK Treasury on the value of natural capital in the national accounts.

More information on this work is readily obtainable from the UK Office for National Statistics. It is an area that has seen considerable development in recent years, and will continue to see development with a view to more fully integrated reporting on natural capital values by 2020. For example, the value of ecosystem services from UK forestry was estimated at £0.23 billion in 2014, a 70% increase on the value for 2007.

Lichen in Pembrokeshire (a sign of clean air) © Charles Cowap

9.0 Conclusions

What does all this mean for chartered surveyors – whether they be practising valuers, land managers or estate managers?

A number of observations for professional practitioners clearly emerge from this brief review.

- New approaches to the valuation of nature will increasingly become apparent in traditional spheres of work. Land use and development decisions will more often draw on these areas, and evidence will increasingly be sought to assist such decisions.
- Clients will therefore wish to see these approaches incorporated into the advice they seek and need for development, asset management and valuation and appraisal.
- Traditional methods of, and approaches to, valuation may find themselves increasingly overshadowed by consideration of Total Economic Value.
- Chartered surveyors may find themselves lacking the skills base and knowledge to engage with these wider concepts.
- However, the case studies offered in this paper demonstrate that chartered surveyors do have skills, knowledge and experience to be used in this sphere. Chartered surveyors should develop these insights and become more confident in their interpretation and application.
- Chartered surveyors have much to learn from what has already been done, but also have much to offer based on their professional and institutional experience of commercial valuation, land management and client engagement. Their brokerage skills can also be invaluable, as the Llynfi study demonstrates.
- Chartered surveyors must strive to understand and incorporate these approaches into their traditional ways of working and supporting clients. Potentially, chartered surveyors have much to offer based on their experience grounded in the practical day to day management of land, property and its appraisal and valuation. The identification and dissemination of more case studies from chartered surveyors who are already actively involved in these areas would be welcomed by RICS and would assist in informing RICS what further guidance, education or training would best help the profession to move forward with these areas.
- These developments will offer new opportunities for those chartered surveyors who are willing to identify and grasp the opportunities. The need to engage with them will be increasingly necessary just to stand still.

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