

Natural England Landscape Network
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Questions and Answers

**Landscape and Natural Capital in a National Park:
The Case of Exmoor**

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IMPORTANT NOTE: Much of the audience involvement during my webinar presentation was **discussion** as opposed to **questions** addressed specifically to me. In my **responses** below, I have added my own contribution, where possible, having highlighted the relevant section of the text. An earlier version of these notes has been slightly edited where thought necessary for clarity and to remove contributors' names. It was a rich discussion from different perspectives, my own being that landscape is an economic issue. I regard nothing in my responses as 'the last word', and I shall be pleased to continue the discussion with anyone who may wish to do so (email address above). Many thanks indeed to the webinar participants for their interest and thought-provoking contributions, and to Natural England for permission to post these anonymised notes on the Exmoor Society website.

Question: I haven't read Lorna Doone and I don't know how much the landscape is "a character" in the story. But I've read Hardy's Return of the Native, where the heathland is. Don't you think that the 17th C landscape of the novel (or even the 19th C landscape known to the author) would be very different to today's? Do people who visit because of the novel notice the "shifting baseline"? Do they care?

Answer: Certainly, 17th or 19th century landscapes in Exmoor would be different from today's. For instance, there would be no road network and extremely sparse signs of human settlement. Enclosure for farming owes much to the Knights' activities in the 19th century. Do people care? I do not think so. One reason is that some features are timeless, whether in Exmoor or elsewhere, most obviously its topography, watercourses, and much of the conspicuous vegetation. Things are

never the same, but there remain sufficient of physical qualities that enable people today to connect in their imaginations with earlier times.

Also, authors such as Blackmore and Hardy must be credited for their supreme skills with use of language. In words, they convey a sense of place, its atmosphere and connection to the people who inhabit it. In a work of romantic fiction, such as Lorna Doone, the author leads a reader to believe in the narrative by integrating the lives, experiences, moods and emotions of people with the physical landscape itself. Even if a reader has no direct knowledge of a real location such as Exmoor, its description is sufficient to remind them of analogous situations and their personal responses to them, e.g. the biting cold of winter ice and snow, feelings of being lost in fog, fear of the dark, the sense of tranquillity experienced in a beautiful place. Even if a depicted landscape is pure invention, readers can connect to it from their own experienced or imagined reality.

I suggest there is another important dimension to people's enjoyment of place such as Exmoor. I recall insufficient of Hardy's 'Return of the Native' to comment on that work. But from personal experience, I might add Marryat's 'Children of the New Forest'. Fictional human characters may be based on people who really existed in the past, or wholly imagined people attributed with actual local names who inhabit recognisable real places. Either way, they are made real in a way that captures a reader's imagination, in the mind becoming actual occupants of the landscape described.

For a modern-day visitor to Exmoor who has read Lorna Doone, the enjoyment may come from experiencing a vicarious connection with such people, locations, and events described for that past time. For anyone not yet familiar with the book, curiosity may encourage them to read it. In some cases – a personal anecdote – as a New Forest boy Marryat's book seeded my deep emotional attachment to where I grew up, a life-long interest in history and the countryside and, in a sense, everything that followed that led to my writing this now. Perhaps that is instructive about the merits of assuring that young people should have access to our protected areas; it may inspire them in so many different life-shaping ways.

Question: I agree we attribute qualities to places - does natural capital approach tell us we need to change some of the attributes we apply to landscapes?

Answer: Much discussion of natural capital (not all) relates to its provision of functional ecosystem services – fresh water, better soils, climate change mitigation, etc. But a landscape is valued for more than the sum of its individual parts, such as beauty, tranquillity etc. which, in a national park or AONB, represent their exceptional qualities. So yes, we need to recognise these valued attributes which arise as a 'package' from pursuing what may be regarded as more obviously 'useful' functional objectives. A problem is that such attributes are intangible and provide more than usual difficulty for monetary valuation. Crucially, absence of monetary value does not

mean lack of Value (the capitalisation is deliberate). The outcome of calculations for those components amenable to valuing in monetary terms should always be qualified by judgements reached by political process that account for the non-monetised. Otherwise, the monetised components are weighted disproportionately, the non-monetised at risk of being considered worthless because absence of monetary value is interpreted as implying zero Value, which is not so. Environmental economists continue to develop techniques aimed at 'filling the gap'.

Acquiring a sound understanding of what derived monetary values mean is a subject for another exposition. Financial value is different from economic value. The latter, incidentally, was the basis for analysis leading to international political acceptance of need for radically different approaches to agricultural policy intervention. There is, however, pragmatic purpose in focus on financial values, because politicians responsible for policy decisions and allocating budget funds naturally think in those terms.

Discussion: It is precisely the point of the concept of natural capital that even though a resource might not have been transformed by people, it might have been providing services to them.

Yes, resources can provide services without people's intervention, for example air and rainfall, but that does not make them capital. My criticism of the natural capital concept is that precise definition requires acknowledgement that it conflates two things: natural resources, and capital. (Incidentally, a problem with economics jargon is that everyday words are often used with a different meaning. Regrettably, not much can be done about that.) I used the term 'natural resources' because years ago it was the widely known concept when the field of environmental economics was in its infancy, and concern was growing about scale of human exploitation of the Earth's given ('God-given' as was commonly the description) endowment of basic resources, and the idea of 'natural capital' not yet evolved.

To be clear, capital is not an easy concept. Probably most people think of it in financial terms, while physical, social, human, intellectual capital are also frequent qualifiers ('career capital' is another term I encountered in a 'Financial Times' column a few weeks ago.) My key point is that any form of capital is the result of human intervention, not something that is just there. In the natural capital context, it involves transformation of natural resources into more useful intermediate forms so that people engaged in production can obtain the goods and services they ultimately want.

To help understanding, in my presentation I asked you to imagine our world without people – land, sea, forests, animals, plants, minerals, fish etc. would be there, the life-forms busily engaged (in our modern-day terms) in ecosystem activity. In my simple story, people arrive to discover these endowments of natural resources available for use. They apply their ingenuity to create intermediate products (goods

and services constituting capital) used, in turn, to obtain the final products people want to satisfy their ultimate wants and needs (i.e. final consumption).

Taking Exmoor as an example, human activity has transformed the landscape over a long period of time, leading to what we see today. As a farmed landscape, it has contributed to food and fibre production through the ages, both classes of final products desired for people's consumption. Exmoor itself is indeed natural capital ('nature-al capital') because people have transformed its base of natural resources (nature's bequest of land, forest, flora and fauna, watercourses, and historically, mineral ores) into new forms (capital), their use intermediate in the production of final products.

Largely incidentally, they have also created an environment valued by society for its beauty and tranquillity. In economics jargon, such facets evolved as 'positive externalities' or 'external benefits' because their value was not accounted for by the people who produced them. An attractive farmed landscape is an example, if it comes about incidentally to farmers' creation and husbandry of fields, hedges, buildings, crops and grazing animals, when their focus is simply to make an income from agricultural commodity production and sales in their own private interests. For society as whole, social benefit = private benefit + positive externality. Similarly, social cost = private cost + negative externality, the latter being the relevant relationship when, say, in an area of outstanding natural beauty, a farmer applies to erect a conspicuous hill-top barn that will spoil the view.

Discussion: I thought that economics was the study of how these values are transformed into decisions via resource allocations, which is measured via money?

Not quite. The wording needs to be recast as "how resource allocation is determined by decisions that take into account relative valuations of resources and products normally, but not exclusively, expressed in money." In relation to our National Parks and AONBS, our concern should always be to take decisions considered best able to maximise net social benefit = social benefit – social cost. (See above). Irrespective of practical difficulties of measuring the Value outcomes in monetary terms, that logic should always apply.

Discussion: In the Lake District, if we decide to value the Lake District National Park landscape because Wordsworth valued it, does it matter if the landscape today is different from the landscape that Wordsworth experienced?

No, it does not matter that the Lake District landscape is different from Wordsworth's experience of it. Wordsworth's status as a great poet is one of many attributes associated with the Lake District. People may enjoy being there because they associate it with Wordsworth, but for many (most?) that is unlikely to be the only reason. We value a landscape because we experience its attributes through our own eyes and other senses – grandeur of the mountains, lakes, the distant views,

fresh air, feelings of physical and mental well-being acquired from being there. So, we value the landscape because of what it means to us now, not only because someone in the past did.

Discussion: I agree that secure, sustainably produced food, is a public good!

I greatly appreciated ***** allowing me to tease him! The crucial point is that unless activities carried out in private interest - here farm and food production - are subject to external intervention, it is improbable that sustainable practices and food supply consistent with assuring security will be achieved. That is because food producers are not rewarded by the market for doing more than supplying to meet people's immediate demands at prices sufficient to cover their costs and make a profit. In other words – and the familiar consequence of being a 'public good' – sustainability and security requirements are underprovided unless government intervenes. It needs to provide some form of subsidy to capture the additional social value attributed to sustainability and security.

Discussion: Public goods - anyone else can benefit from it without a loss to my benefit. How does this apply to culture - **what if the benefit is only accessible to small subset of the public? I.e. if the culture only has value to those who create it/participate in it?**

This question points to limits of the public good concept. As with a private good, these are the 'tidy' extreme definitions that in many contexts need more subtle interpretation. 'Culture' has many dimensions. From the question, I take it to imply people's access to art and architecture, drama, music, and literature.

If I buy a ticket for admission to an event, clearly no one else can have that same ticket. Albeit inadvertently, by so doing I exclude someone else from enjoying the performance or exhibition (unless, of course, they can buy a ticket themselves). In this case, 'culture' is a private good. It may indeed mean that only a subset of the public, those who can afford to pay for tickets, can access the benefits. If only those who can pay are those who care about provision of the 'culture' (opera, for instance?), then let them pay for it as a private good.

But suppose government, on behalf of society, decides that culture is intrinsically 'good' for everyone, and so restricting access by ability to pay is unacceptable. That is the argument for free admission to museums and art galleries – and indeed for maintaining people's free access to national parks. Taxpayer-funded subsidy is the solution to the problem if access is constrained by people's ability to pay, ideally by sufficient subsidy to make it free. In such situations, those people who do not participate do so from choice. By this arrangement, 'culture' is made non-rival (free to everyone) and non-excludable (anyone can benefit, if they choose).

Let's take the arguments a stage further, leading to an observation important in the context of our national parks. Looking at a painting, say, or listening to a concert, or

looking at the Exmoor view from Winsford Hill, share the characteristic that everyone can benefit simultaneously from the experience without loss to anyone else. EXCEPT! If free admission leads to overcrowding (excess demand for the event/location) each person's individual benefit is likely to be diminished because other people are a nuisance. In that case, some form of admission price may need to be charged to reduce demand. Fortunately, Exmoor currently does not have this problem, unlike the Lake District, New Forest, elsewhere? Discuss!

Question: Landscape is an excellent medium to engage with people about how their place has changed and what people presently value about their area. As you have highlighted all landscape attributes interact to form the character of a place . . . the sense of place that people connect to. It is important that the attributes ascribed to natural capital add up to the totality of their place, including the built environment. How can we ensure that this happens?

Answer: I think that we must keep repeating the message time and time again. It is changing people's attitudes that is the problem, getting it ingrained in how people look at the world. Maybe Covid-19 will help in that regard because lockdowns have pushed into the limelight the importance of people having access to the outdoors for both their physical and mental health. All of us committed to promoting consciousness of the meaning and benefits of landscape-scale perspectives should aim to capitalise on that.

Discussion: (In response to another participant's argument) often levelled at some arts such as opera or ballet, I'm not particularly a fan of either. However, I appreciate a world where they exist even if I don't personally participate.

Yes. It is difficult to compartmentalise 'culture', and no accident that the term is used in its broad sense to describe the attributes of whole societies, e.g. British as opposed to, say, American culture. All kinds of qualities are encompassed by such distinctions. I may not like, say, the music of Benjamin Britten (untrue), but I am pleased to be part of a society to which he contributed so much to its music culture, with links to its poetry, literature, and so on, and so is an integral part of my own sense of national identity along with so much else I share with other people like me.

Question: Interesting points, how do we interpret/publicise natural capital of all kinds to make it available to everyone, including groups who feel excluded for a variety of reasons?

Answer: Given increasing public awareness of environmental issues, indeed with increasing concern for the sustainability of human existence, I think that we need more of the same in terms of raising awareness and understanding. To put it another way, we can all try to make our own 'David Attenborough contribution'. A different dimension is political and economic. Why may groups feel excluded? A reason often encountered in relation to young people gaining access to national parks is the expense of transporting them. School trips are costly, for schools and low-income

parents who may be asked to contribute. And if lack of money is a deterrent with young people, so it is for their parents and other groups needing financial support. These are public policy issues and must be addressed at national political level.

Discussion: That idea that the flows go R to L is built into the natural capital typology - natural capital has certain ability to produce flows and services that is why we have identified them. Arrows go both ways

Yes, they do. *****'s correct observation shows that my explanation for going right to left needs improvement. It all depends on the question. First it is important to separate two components, both of which start with the simplest model of what economic activity means:



Fundamentally, economic activity is about the transformation of the world's (initially natural) resources into products (capital as intermediate product + final products that capital is used to help create) to satisfy people's consumption wants. Note that capital as intermediate product is therefore equivalently an input ('created resource'). Mindful of my own qualification to the natural capital definition, instead we may recast the simple relationship to include natural capital with Resources (= resources 'as found' + resources made by people's intervention, natural and otherwise). Then Products are exclusively the final products from which People benefit.

The left-to-right perspective is correct when, in our specific context, natural capital is viewed as being transformed into ecosystem service products for people's benefit. Crucially, expressed that way the relationship is entirely technical, not economic. It is a description of a process with characteristics determined by how our physical world is made, and it works at all levels of aggregation. So, for example, we may consider use of farm resources for production aimed at satisfying people's wants for food and fibres. Or it may describe the relationship between all resources in a national park that produce a landscape in which some people benefit by their work, others by their recreation, and for exercise and tranquillity.

Note that these examples 'lump together' different kinds of resource to produce a range of different products. At its simplest, interest may be in the relationship between variable quantities of one resource (nitrogen fertiliser, say) and the quantities of one product (grass for livestock, say) for a given environmentally sensitive area. In economics the basic concept is a technical resource-product (or input-output) relationship called a 'production function.' And if you know the technical input-output relationship, you also know its inverse, the output-input relationship.

But for economic analysis, there is a missing element. The physical relationship tells us nothing about exactly how much product (of whatever kind) people want, what quantities of resources are consequently needed to produce it and, even if technically possible, whether it is worth it. That would not matter on one condition - if

resources were so abundant that people could have whatever they wanted, in as much quantity as they wanted, any time they wanted, because resources were not *scarce*. Scarcity is why **economics** exists because it means that **choices** must be made about the **allocation of scarce resources**. Moreover, the aim is to allocate the scarce resources at our disposal **for maximum human benefit**. And to answer the allocation question, we need criteria to guide allocation decisions based on **people's collective valuation** (i.e. **social benefit**) of products wanted for their consumption. (NB: This echoes a point made above.)

Much attention is paid to natural capital accounting, and questions about the value of natural capital assets, the basic means of producing ecosystem services used by people for their benefit. For sure, natural capital does not arrive from nowhere with a monetary price tag attached. So where does its value originate? The answer is from the value(s) people attach to the benefits it provides. For any scarce resource, its value derives from the value of what it produces. (True, there are complications that need not detain us here. Let economists worry about that!)

An example: why is land for housing (product) more expensive than land (resource) for agricultural production? Answer – because housing is valued more than agricultural products, reflected in a higher monetary price paid per hectare of land destined for building. Take the example another step – why is a new house built in a national park more expensive than an identical one built outside? Answer – because planning regulations and national park designation a) make a house located there more desirable to live in and b) opportunities to acquire such a house are especially scarce.

For 'resource' substitute 'natural capital'. At any given time, the value of natural capital stock (the asset value) is therefore a reflection of the value attached to the benefits it produces (the right to left perspective). It will vary though time as the values for what it produces change. Society nowadays grows increasingly aware of how natural capital provides vital ecosystem services, meaning that those services are considered increasingly valuable. That in turn justifies natural capital investment so that more ecosystem services are produced. The signal to do so comes from the right, not the left.

In summary, I hope the above helps to explain better why I argued for looking at the relationship from right to left, not left to right. It was only because my focus was on the **value** relationship, **not technical** relationship.

Question: Exmoor's landscape has changed since prehistory. How does it need to change into the future to enhance natural capital but in a way that conserves all those special attributes of the landscape and 'natural beauty' shown in the photos?

Answer: My answer follows directly from the above. If we want to conserve the special attributes and natural beauty shown in the photos, first we need to understand the technical relationships (primarily ecological) to which we apply values

for the products (attributes including beauty) and then relate them to the costs (monetary values of resources) of conserving them. Sometimes we may have to confront uncomfortable facts, such as that it isn't worth it (because the value obtained is less than the natural capital costs of providing it) or, with climate change, it is technically impossible to achieve or, at best, capital depreciation can only be slowed as the landscape is transformed by overwhelming natural forces. On the positive side, investment in natural capital enhancement is worthwhile when the value to society of cleaner air and water, carbon sequestration, and other environmental improvements, is very substantial – as we know it to be.

Discussion: Some of those benefits were being produced for people even before we realised they were doing it.

Indeed, as will have been true when world population was very small relative to the abundance of natural capital. That being so, there was no economic problem, i.e. no allocation problem because no scarcity. In effect, people got the ecosystem services for free. We have discovered the environment, importance of natural capital, merits of biodiversity etc. only because there are so many of us wanting more and more from the world's resources, both as capital (see above) and for final consumption, that we – people – have caused scarcity from a starting point of abundance.

Question: What would people think of a good farming measure being no artificial fertiliser in the Exmoor National Park?

Answer: As an economist, I could answer authoritatively only having investigated the effect of withdrawing artificial fertiliser use on a) farm production, b) water quality and implications for water treatment, c) any health hazards diminished by reduction in chemical (e.g. nitrate) pollution, d) benefits to flora and fauna. In short, a broad social cost/benefit analysis would be needed. A 'good' farming measure may be very bad for farmers, in which case we would have to ask if, say, the measure caused at least some to go out of business. It may be concluded that society as whole would be so much better off that loss of some farmers still would leave net social benefits. Whether that outcome would be deemed acceptable is a political question, not economic.

Question: Regarding a too subjective view of natural capital: a woodland may be very valuable to me and not at all to somebody else; attractive to me and ugly to somebody else. So, don't we need standard attributes which are broadly agreed to benefit society (e.g. more biodiversity) rather than conserving depleted landscapes because that's what people have known from the last few decades?

Answer: I do not think there is a conflict here. Society must decide its priorities by political process. As individuals, we may differ over what we value. But we still must reach a consensus about what is important or unimportant, mindful that we all agree to respect the outcome. Economics provides information that helps guide decisions

in such contexts. Rigorous criteria account for individual preferences in defining the best outcome for society.

Discussion: I think a key point is that at NE our natural capital **work is focused on creating** a healthy and functioning ecosystem from which we get a **number of benefits** (including thriving wildlife or nature for nature's sake).

Yes. Intuitively, the greater the number and diversity of benefits (a consequence of restoring biodiversity) the greater the contribution to people's wellbeing. Keep doing it!

Discussion: I think **the point that Keith Howe is making is that the decision on what the standard attributes are should be made at the Exmoor level, not at a national level**

That was not quite my intended point. Rather, standard attributes decided at national level should be implemented taking into account local conditions. Natural England has sometimes been thought too prescriptive in relation to environmental measures, assuming that, say, conditions in the south west England uplands are identical to those in the northern uplands. They are not. In farming, no one is more expert about a holding than those who farm it. Farmers who feel that their own knowledge is ignored come to disrespect third parties ostensibly there to advise them or monitor compliance with agreed activities. The argument applies not only to farmers, of course.

Discussion: Unfortunately, in some instances **different natural capital outcomes are distinctly at odds, and decisions need to be taken to prioritise them** where they cannot coexist. I.e. the maintenance of an open landscape though upland burning vs negative impacts on infiltration/runoff regimes and soil carbon. This is **too often avoided in these conversations**, and the apparent desirability of an open landscape to the general public is assumed - I think this is less and less true as more people understand the diminished natural capital function of upland landscapes.

Yes, always there are trade-offs, an 'opportunity cost' of a decision taken, i.e. the benefits inevitably lost because the decision taken necessarily precludes its (strictly best) alternative. Constantly, economics asks questions about trade-offs, what combination of outcomes and resource use is best overall. They must not be avoided in conversations about what is wanted, because trade-offs are inevitable. Remember, the ultimate objective is to maximise net social benefit, ideally having considered all options.

Discussion: Our natural capital indicators are what we (& 80 specialists at Natural England/Environment Agency) think "what good looks like" for attributes needed to provide the benefits that we need. Obviously, the cultural benefits are a bit more difficult, as things like beautiful views are more subjective.

No comment

Question: By taking this natural capital approach, how will a landscape like Exmoor deliver action for nature recovery or climate resilience?

Answer: As a predominantly farmed landscape, both farmers and all other relevant landowners must have sufficient financial incentive to make the changes desired in what they do. That is what ELMS should deliver if it works as intended. In effect, public goods provision must be made to look like private goods to front-line decision makers. That way, social benefits are gained via commercial decisions, the only method short of regulations.

Question: In the natural capital assessments/mapping you undertook, how did you take account of different field and boundary patterns and the 'non-living' landscape features (such as distinctive built elements, geological features, earthworks) and other 'capitals' that create the unique landscape character and special qualities across the National Park? Is there a role for greater place-based approaches to natural capital accounting, that link more clearly to landscape characterisation?

Answer: I cannot answer the first of these questions adequately, simply because the National Park Authority currently is considering just such issues. As you saw from the presentation, the first task was mapping, identifying what is there. Regarding the second question, in principle I think there is scope for greater place-based approaches to natural capital accounting. In practice, the methodology has to be standard or the result will be such confusing complexity that the outcomes become largely meaningless. More likely, the different elements comprising natural capital categories will be standardised. Then different places will be shown to comprise different combinations of characteristics (e.g. Exmoor and the South Downs) to which values relate.

Discussion: Using a natural capital approach values wildlife because humans attach a **value to wildlife - it has a cultural value.**

I agree with one qualification – I think that specific mention of cultural value is unnecessary. If humans value wild life, for whatever reason, that is sufficient.

Discussion: It's not only humans that attach value to wildlife, there are many animals that utilise farming techniques to ensure their survival. **I not sure I agree with the notion that capital requires human interaction.**

I appreciate the point made, not uniquely by ***** of course, but I have long had difficulty with the basic logic. If we say that not only humans attach value to wildlife, inevitably that is only our human interpretation. It cannot be otherwise. We are trapped by having to interpret the world we inhabit only in our terms. We may do so by analogy, such as when we observe animals 'using farming techniques' or, say, an ape picks up a stick to probe a termites' nest. We can say that the animal has used its intellect to transform a twig into a simple tool (capital). That is not to say the ape sees it that way or has a capacity to articulate 'social benefit' as a concept in group

behaviour. As we observe with any instinctive behaviour, say a cat stalking a bird, it may be wired into the life-form, not the outcome of its conscious deliberation.

I have had to consider such questions many times over the years when teaching veterinary epidemiologists the rudiments of economics. When we take our sick pet to a vet, for whose benefit is it? Clearly, we say, it is for the pet. But who decides to take them, and why? Answer – we care about our companion, ‘feel’ its pain because, like us, it is a sentient being, and anyway consider it wrong – a moral affront – to allow any such creature to suffer. For several reasons, it is exclusively *our decision* to go to the vet because, by association, ultimately our sick pet causes a loss in *our wellbeing*.

Returning to the issue concerning us here, everything we say about natural capital, ecosystem services, and are about the benefits obtained for us, humans, and correspondingly the costs in terms of our lost well-being if we continue to be negligent. In the extreme, probably the best solution to natural capital depreciation would be if people quit the planet; dynamic ecological equilibria would be restored, pollution and non-renewable resource loss be zero, and biodiversity revive as species extinction ends. But there is no prospect of that. The existential problems we have come to recognise and worry about fundamentally are about us, our wellbeing, not anything else’s intrinsic right to existence.

Discussion: Yes, we do have cultural value of wildlife, and in our indicators we include this as an indicator for cultural quality. But I think the point is that we **need to remember the ecosystem approach principles as well as natural capital**, and that’s why we also focus on creating a healthy and functioning ecosystem, **rather than solely on benefits to people**.

See above.

Discussion: I tend to disagree with your point ***** about cultural services within the natural capital model, cultural benefits being a bit more subjective - there are clear methodologies we should be using and embedding into our work but too often I suspect we don't ask the right questions within our organisation, at the right point, perhaps driven by an assumption that this stuff is too subjective to warrant detailed consideration. The very limited number of specialists within Natural England who cover this work area really doesn't help.

Not qualified to comment

Discussion: 'Final benefits being human wellbeing' is **under valuing the elements of life itself** - natural capital defines our survival.

I suggest that the most important single contribution of the natural capital concept is that it casts the spotlight on the truth of *****’s observation. People have been slow to realise that the environment cannot be treated as ‘a free good’. Scarcity has replaced the relative abundance in past centuries of what we now call natural capital,

so we have a new class of economic problems to solve. Interestingly, many people now talk about natural capital without, I suspect, quite knowing what it means. But in many contexts, precision does not matter. What is significant is that they are talking about it and know why it is important to do so!

Discussion: Local register and analyses of natural capital and change might be linked into the National Character Area refresh, and both made more accessible to people as a resource

(Agreed by others) I think that would be a very useful development.

Discussion: I totally agree public goods can be defined as private goods to farmers - such as restoring microbial health of soils.

Indeed, ***** . I hope that the necessary instruments are put in place to achieve it.

Discussion: I agree with all this analysis and the precise enumeration of natural capital features will be critical. The argument in the Exmoor society publications is that cultural attributes are part of natural capital, so **a lot would depend on what these cultural attributes are and how much they are valued relative to natural attributes**

Agreed

Question: Great presentation. If farmers are price-takers then do you think it is possible for Payment for Ecosystem Services to take over as an income stream (perhaps income coming from multiple parties - private and public in a given location)? Would that ever be profitable enough for farmers to switch over their business?

Answer: My simple answer is 'yes', but please read my 'Exmoor's Farming Future' article (see the brief reference list on my penultimate slide) for discussion of the relevant issues. Regarding profitability, it is that which will drive farmers' decisions. If PES is to work, it must lead to profits sufficient to incentivise farmers to change what they do and how they do it. Frankly, the structure of the farming industry leaves them with no choice.

Discussion: **Is it not also a matter of penalising bad practices** that damage soil, air and water quality? (not only paying for public goods). Currently it seems too cheap to pollute water courses, etc.

Yes, it is. 'Polluter pays' is a sound principle because private actions can be at much greater social cost, so must be discouraged.

Question: How will there be guaranteed monitoring of the outcomes of delivery, i.e. real success of measures taken to deliver natural capital, and whether those benefitting from payments are really doing what they are paid to do?

Answer: There must be monitoring to assure compliance. A proposal for Exmoor is that farmers themselves should self-police. Clearly, devising an efficient system requires careful thought. But one provision should be that everyone loses financially from individual or sub-group transgression. That is an element in the idea of what I called a 'beauty bonus', a money reserve retained for paying out on an equitable basis when Exmoor farmers' collective actions generate social benefits over and above those arising from farmers' private actions.

Question: If there were to be Exmoor based decisions on the suite of public goods paid for by ELMS, who does Keith think would be the appropriate decisions makers to decide these? The Exmoor NPA? A citizens' jury? A unit in Defra?

Answer: A definitive answer needs careful thought. But as a first attempt, the definition of public goods attracting payments can only be within a nationally determined policy framework. Thereafter, translation into action needs local input from those best qualified to know local conditions. Exmoor NPA would be an appropriate institution, probably with a new ELMS unit within it.

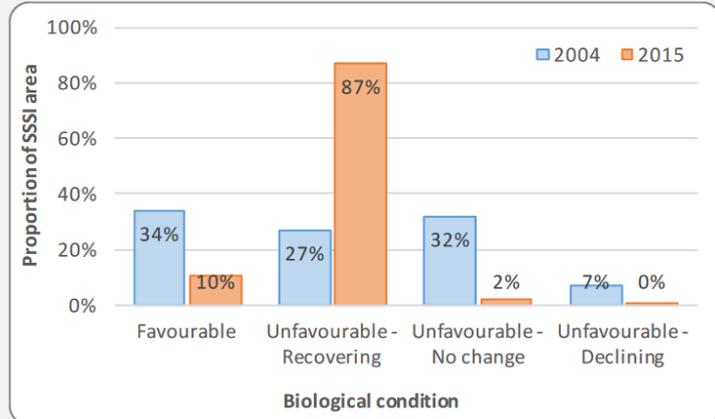
Question: Definitely thought-provoking. On more practical and evidence-related issues though, do we have any evidence of natural environmental improvements from the subsidy/grant that has gone into Exmoor over the last thirty years? Clearly these have sustained farm businesses, but what are the environmental benefits? Are there any? Or have they sustained unsustainable practices? My experience of Exmoor - and I'm an unapologetic nature conservationist - is that it is a highly modified landscape with ecologically rich/intact bits relatively marginal to the rest much of which from a truly 'natural' capital perspective remains in my view severely compromised.

Answer: Going some way to help answer the question, I refer you to https://www.exmoorsociety.com/wp-content/uploads/2016/07/Exmoor_Moorland_Report_2016.pdf, from which Box 2 below is copied:

Box 2. Change in the biological condition of SSSIs since 2004

The chart shows the categorisation of moorland SSSI areas into the four main categories of biological condition assessed by Natural England in 2004 and 2015. The changes are complex and require explanation. Three factors are likely to be responsible. These are (i) 'real' changes in the condition of habitats as assessed by Natural England staff on site; (ii) judgements made on the potential for improvements as a

result of land being in suitable agri-environment agreements; and (iii) the way favourable status is now assessed by Natural England. The first two factors are responsible for the improvements in condition shown by the movement of areas classified as being in 'Unfavourable No Change' and 'Unfavourable Declining' to 'Unfavourable Recovering' condition. The third factor is responsible for about a quarter of the SSSI area being reclassified from 'Favourable' to 'Unfavourable Recovering' condition due to more stringent field surveying of habitat condition.



However, with the notable exception of the Graze the Moor Project report, (see <https://www.exmoor-nationalpark.gov.uk/Whats-Special/moorland/graze-the-moor-project>) the evidence available is mainly anecdotal and not collated in any single source. I think it fair to say that funds have been spent towards ecological objectives in accordance with the prescribed method. But questions arise as to whether they have been the right prescriptions and could the results have been generated by payment by results. Consistent with the view I mentioned in my presentation, there is criticism of micro-management of the process. That is the area where it is felt that use of local knowledge has been marginalised at best. I agree with your observation about sustaining the farm business. Negatives have arisen from taking stock off the land in the winter. They have to be housed, the sheds have to be built (excessive capitalisation of the enterprise), the housed stock have to be fed, and silage made involving fertilizer, rolling and re-seeding permanent pasture. The silage produces effluent, stock not housed on straw mean slurry lagoons must be provided, and the effluent has to be spread by expensive machinery which requires further investment. In the days of "dog and stick" farming, systems did not extract the last ounce from the land in every forgotten corner of it.

Discussion: On the question of how to make the policy effective. Who sets the policy? What will the trusted institutions of the future be - I think the answer has to be democratic and representative

I agree. At the core of what is happening in Exmoor in relation to Exmoor's Ambition and ELMS implementation, there is built-in recognition that those who will be responsible for making changes in the directions desired – highly dependent on farmers in the Exmoor case - must be put at the heart of decision-making. The

economic structure of farming (see my Exmoor Review articles) guarantee that farmers *will* (not *may*) respond to business incentives. But to be fully effective, it is essential to recognise that although often needing help along the way, no one is more expert in knowing the technical characteristics, possibilities and constraints for a farm than those who farm it day in and day out.

Question: Some sort of local accountability for public money for public goods will become increasingly important - especially as people start to recognise that their taxes are supporting these outcomes then they may well start to demand to see what these benefits are . . . how can this be factored in?

Answer: This is another political issue. In government we have evolved a highly centralised system for decision-making and control, the latter including for local authority budgets because a high proportion of finance comes from central government. Local accountability will become increasingly important only if more responsibility for finance spent by local communities is raised by those communities and its use made fully transparent.

Question: So potentially the Exmoor landscape could change dramatically in future - towards a much more extensively managed character offering much more semi-natural wildlife habitat, and a more 'natural' experience for visitors?

Answer: The outcome will depend on whether it pays farmers and landowners to adjust their businesses in ways leading to those outcomes. I repeat in conclusion, landscape is an economic issue. It is essential to try changing people's preferences (i.e. sense of values) so that natural capital is enhanced. But raw economic incentives and disincentives will remain key because that is what shapes the world more than any other factor. If any of us doubt it, ask if we would do our job unless someone paid us to do it?

End of notes