

LESSONS FROM COVID-19 & THE DASGUPTA REVIEW

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'The pandemic has made us deeply aware of the importance of understanding microbiology. If we can better understand the complexity of our bodies and work cooperatively with it, that indeed will be key to unlocking greater health for us; but if can do the same for soils that will lead to a renewed relationship with the wider natural world that sustains us.'

The global pandemic has forced us to learn important lessons the hard way – at brutal cost to many individuals and those who care for them. Many of these will need no repetition but one point made by Richard Mabey, the great British nature writer, was that Covid-19 has taught us that a wholly benign view of nature – the oft mentioned value of engagement with nature as good for our health and well-being – is simplistic. This coronavirus reminds us that we are exposed to other organisms constantly as we eat and breathe for good or ill, that we are embedded in nature, and are and never have been separate from it. Whether we see it as threat or instrumentally as serving our needs or as something we are called upon to steward, our lives and fates are profoundly interwoven.

Notably this is also a central message and starting point of the recently published *Dasgupta Review* – the product of the leading economist commissioned by the UK Treasury. It makes clear that 'We are part of Nature, not separate from it,' and then goes on to draw lessons which inform understanding of our economic relationship to nature and the threat our current use of it poses: 'We have collectively failed to engage with Nature sustainably, to the extent that our demands far exceed its capacity to supply us with the goods and services we all rely on.'

Dasgupta frames this in the language of natural assets and natural capital which we have signally failed to manage well. But he also and absolutely connects this to our destruction of biodiversity and the role it plays in enabling 'Nature to be productive, resilient and adaptable'. There is current decline in biodiversity unparalleled in the human era and at '100 to 1,000 times higher than the baseline rate'. This increasing loss of our natural asset base means Nature's ability to produce the goods and services we need is diminishing fast but so too is its inherent diversity which enables it to remain resilient and responsive to change. This decline in turn is 'fuelling extreme risk and uncertainty for our economies and well-being'. So perversely, the way we are pursuing economic prosperity – and the putative well-being that derives from it – is a snake eating its own tail: we are all too successfully destroying the Nature which provides for us. We are getting nominally richer, not only because of Nature but at its expense.

The relevance of this analysis to the issue of food security is evident. Food (and drink) are perhaps the most tangible human benefits of natural systems and processes. But the productivity of these systems is under threat as Nature declines and so then is the secure supply of our food. Perversely production of food globally is the leading driver of

biodiversity loss through agriculture on land and, through overfishing, a similarly destructive force on the health, capacity and diversity of ocean ecosystems. Agriculture in the UK is, as part of the wider economic system, a perpetrator failing to properly value nature and its assets, but is also victim of it. The economic models and measures we use either at the macro level – Gross Domestic Product or Total Factor Productivity – or the micro level – such as in the balance sheet and profit and loss accounts of farm businesses – fail to reflect the value of farming’s prime capital asset: the soil and its health. At the most simple level at which farmers’ businesses operate of income and expenses – or the flow of cash coming in and going out – the price of wheat or of livestock or milk dominates, not the value of soils. In truth, farmers have rarely received the right economic signals to manage their soils in ways that conserve them. So while they may unwittingly (or in some cases heedlessly) degrade their land they are also victims of an economy which has failed to reflect Nature’s value to them and society at large.

Soil is perhaps symbolic in several important ways of our wider relationship to Nature. As Dasgupta says, part of the problem is that: ‘aspects of Nature are mobile; some are invisible, such as in the soils; and many are silent.’ Unlike much of what we think of in lay terms as biodiversity – mammals, insects, birds we can spot – soil presents mainly an impenetrable flat surface; and the life it supports – much of it at microscopic level – is largely invisible to the unaided human eye. As such soil can look lifeless, inert. Conceptually we downgrade it and degrade it – and vice versa. The impenetrability of its surface – though we can dig into it – also masks its shallowness and fragility: this living planetary skin is, compared to our own, around 10,000 times thinner yet we rely on it for some 95% of our food. Our other main source of food, the ocean, shares this impenetrability and invisibility of life – its life, large or small, is hidden. It can also look lifeless. Until recently we knew little of the vast biodiversity of the sea in its deeps; and for both soil and sea scientific understanding of their life at microbial

level is in its infancy. It is then relatively easy to understand how we have failed signally for centuries if not millennia to properly care for Nature and for soils. To this we should add as a contributing factor to our economic myopia the apparent boundlessness of nature – the sheer volume of the atmosphere or the expanses of ocean, forest and land. Where we have caused visible damage stripping forests, eroding hillsides or concreting watercourses, the assumption has crudely been that there is always more out there.

Dasgupta goes on to say that various aspects of nature – mobility, invisibility, silence – have enabled damaging human activities to continue as their effects are difficult to trace or account for. The costs are borne by the planetary ecosystem as ‘externalities’ and not reflected in our economies and our assessment of our wealth. For Dasgupta this means planetary costs are not well-reflected in market systems so these do not function properly, but tellingly this goes beyond market failure to ‘broader institutional failure too.’ Thus: ‘Many of our institutions have proved unfit to manage the externalities. Governments almost everywhere exacerbate the problem by paying people more to exploit Nature than to protect it, and to prioritise unsustainable economic activities.’

The question arises how we can achieve the transformation required to tackle the restoration of nature and in so doing also address the problems of climate change – at least those derived from our misuse of nature or where nature offers workable solutions. Dasgupta has three headline proposals: (i) Ensure that our demands on Nature do not exceed its supply, and that we increase Nature’s supply relative to its current level. (ii) Change our measures of economic success to guide us on a more sustainable path. And (iii) Transform our institutions and systems – in particular our finance and education systems – to enable these changes and sustain them for future generations.

The first touches very much on ‘the enormous problem of producing sufficient food in a sustainable manner’. This he says requires more

than technology alone but the restructuring of production and consumption systems. We will need to conserve nature and sustain the natural systems that feed us as less costly than degrading then restoring them. He argues for multifunctional land and seascapes to deliver ecosystem goods and services and proposes large-scale investment in Nature-based solutions to address biodiversity loss, contribute to climate change mitigation and adaptation, as well as deliver economic benefits, including job creation.

There is much to consider here and too little space to do Dasgupta justice. These are not merely economic solutions but wide ranging with implications for change, and which he describes as transformative to ensure we can choose the sustainable path. This in turn will need 'the sustained commitment of actors at all levels' The challenge for taking this forward is to make this relatable and plausible to all those actors from policy makers to farmers and other economic actors to the citizens in the general public. Here returning to the pandemic and what we have and are in the process of learning from it is useful.

As Covid has played out since early 2020 we have learnt much about the relationship between good science and public policy and decision making but also about behavioural science, culture and influencing what businesses and the public at large do. We know better as a society that we need rigorous science with equally rigorous collection and analysis of data. This work matters a great deal (as has sustained UK Investment in health and biosciences) and has proved vital from vaccine development to decoding viral genetics to epidemiological modelling. We also learnt that we need scientists we can trust to advise government and inform the public and to communicate well to both. Thirdly, we need well-informed and advised politicians who make the difficult political and policy decisions factoring in, we must hope, the costs, risks and benefits. Lastly, we have learnt, we need an engaged and informed public that understands the issues, is made aware of the risks,

costs and benefits and so acts to change its behaviour including patterns of demand and - importantly, to ensure there is a loop back to policy - giving politicians the space and support for resolute action. This has to include economic actors - from small businesses to corporate giants - altering their behaviour, processes and objectives in response.

It is not too fanciful to stretch this analogy to how we face the challenge of managing land in the future. The issues surrounding farming are as complex as those within public health and medicine - farming engages not only with climate and weather systems but also ecosystems including those of the soil. At base, how land is managed affects the health of those ecosystems and wider nature, and ultimately our own health through the nutritional quality of what we eat to the quality of the environment we all share. Yet, we have long devoted immense resources to understanding the human body and its systems - physical, chemical and biological. But, as Colin Tudge recently pointed out to me, we have yet to give due attention and resources to ecosystems and particularly the soil upon which we are so dependent.

In terms of addressing the challenges faced in how we manage the land and deploy it to restore biodiversity, help tackle climate change and contribute to human health and well-being - as well as sustained economic activity - we need similar resolve and commensurate resources but also, as said, engagement of all actors in this project. If we narrow this down further to what this might mean for soils, this suggests the following:

- We urgently need significant investment in the science of soils, including physics and chemistry but vitally also their biology and ecology, as well as the collection of representative national data ideally joined up with local in-field analysis and monitoring. We need to understand better the condition of UK soils and their potential but this must go beyond producing food, the principal focus of the agricultural quality maps we have from the

1960s onwards and the criteria which affect its grading (climate, soils, drainage, aspect, topography). We now need to understand the ability of healthy soils to perform multiple environmental services beyond food and fibre production to cover aspects such as water infiltration and storage, carbon storage, supporting biodiversity – and the thresholds when such services may fail as soils degrade.

- We need this science to inform policy makers and strengthen their commitment to putting soil health front and centre of agricultural and environmental policy-making. In the UK this means from the 25 year Environment Plan, when rebooted, to the Environment Bill and Net Zero Strategy. This includes sustained investment in the research: as the Sustainable Soils Alliance has shown government investment in soils compared to other natural elements – water, air – has been woefully small: taking the example of 2017-18 they show that of £68 million committed to research on air, water and soil just £240,000 or 0.41% was spent on soils.
- In terms of engaging the public Covid 19 has taught us that behaviour is not only shaped by financial support or regulation and enforcement – important though these are to set common standards – but also by well-communicated advice, by trusted authorities and social capital – people need to care about others as well as themselves or their immediate family. In short community relations and culture matter enormously too. The cultural shift required is for all of us to think about Nature too and realise that when we harm it we eventually harm ourselves and others, probably those less advantaged than we are.
- The combination of regulation, effective proportionate enforcement and financial incentives such as under the new environmental land management schemes are

entirely relevant to changing the behaviour of farmers and others in the land-based sector. But so too is culture. To manage soils well, to restore them to ecological health we need to recognise both the agri and the culture in agriculture. Farming must take account of the physical, chemical and biological properties of the fields it stewards but also the culture of those who manage the land. This means science and policy must consider the cultural traditions, beliefs, knowledge and applied skills of people who farm and their understanding of their land in shaping behaviour towards sustainable, nature-restoring, productive farming.

- The implications of this are significant: the science we have, insofar as it does guide policy making, is insufficient on its own to engineer the behaviour change we need in land management. Just as in the pandemic where research science and medical practitioners have collaborated to rapidly and radically alter practice to keep people alive, there needs to be a better collaboration between science – lab-based and field trials – with the practitioners, agroecological farmers, with their already vast body of accumulated knowledge of practices that work by taking into account the intricacies of their soils, and of wider nature and its many functions and interactions. Research science by definition advances by specialising in minutiae but practical land management requires more holistic, whole field understanding from the grass roots. We need more understanding of ecology and ecosystems – of the macro – in applying the micro of science to managing the land well.
- This means that top down technological solutions cannot be the sole answer, as Dasgupta makes clear. There needs, as he says, to be a fundamental restructuring of consumption and production patterns. Generally that means a systemic shift away

from damaging linear forms of resource use to re-use and recycling and sharing and a more circular economy. Nowhere perhaps better exemplifies this shift than forms of agroecological and regenerative farming. These harness the soil itself, an eternal combustion engine powered by the sun which drives birth, growth, death and rebirth in a cycle of life that produces food and cycles wastes to nutrients which again drive life.

- This to me then entails giving priority to incentivising, promoting and – where still needed, researching – regenerative and agroecological forms of farming which mobilise nature to restore life and health to soils as the underpinning for fertility, healthy crops and animals and thriving ecology. These in turn can maintain productivity but reduce costs to farmer, in resources and to the environment. This means applying widely a range of techniques already pioneered by farmers here and abroad and made to work for their context, for their land. These include approaches such as blending permanent crops with annual via trees and shrubs, diversity of crops within and between fields, low or no tillage and cover crops to protect bare soils and (re)integration of livestock. Dasgupta cites Nature-based solutions as one of the key tools to restore biodiversity and tackle climate change. We urgently need nature-based farming and it should feature strongly in the range of vital Nature-based solutions to rapidly deploy.

As with any programme for change, proposals and recommendations can merely drive the conversation. Much more needs to be done practically at multiple levels by multiple people. Most importantly, and left to last, is the need to move forward from the point with which we started

in recognising that we are of Nature as is our economy and our entire civilisation. This doesn't allow us to do anything in the name of Nature but to understand better how Nature functions within us and around us. In this we should know that, as David Montgomery and Anne Biklé point out in their book, *The Hidden Half of Nature*, 'the environmental systems on which we depend are founded on cooperation as much as competition'. They add that 'Diversity nested in cooperation creates dynamic systems that can stand the test of time.' Nature is of course the ultimate laboratory which has stress-tested its components over millennia. It behoves us to work out how we can cooperate with Nature in managing the land for our food rather than, as still is oft said, competing with it and seeing farming as replacing nature and its systems.

Lastly, bringing us right back to Covid-19, the pandemic has made us deeply aware of the importance of understanding microbiology. Human health depends on it as our own immune systems wage war on countless attacks of pathogens; yet, science is beginning to show us the critical role played by the microbiology in our own intestines – the rich flora of microbes in healthy human guts – in sustaining those same immune systems. There is perhaps no better way to illustrate our co-dependency on Nature in so many forms than its role in our personal health and its role within us and as part of us. If we can better understand the complex microbiology of our bodies and work cooperatively with it, that indeed will be key to unlocking greater health for us; but if can do the same for soils and their extraordinary diversity and harness their potential, that will lead to a renewed and better relationship with the wider natural world that sustains us.