2 Value(s) and valuation in development, conservation and environment

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The chapters in this collection explore ways in which new economic values are being created, assessed, assigned and understood in a variety of contexts in the domains of social development, conservation and environmental governance. These chapters variously interrogate valuation practices and the calculation and production of economic value through the interplay of moral and economic logics in a number of contexts. These encompass the calculation of value in development programming and aid decisions; government-supported markets for offsetting biodiversity loss and carbon emissions aimed at addressing the coupled global environmental crises of biodiversity loss and climate change; and contested efficiency criteria used to justify water allocation in Africa. Although covering a diverse set of policy domains, the chapters that follow are united in an empirical approach to value that focuses on 'how' questions. How are newly economic values being made, performed and represented in the fields of development, conservation and environment policy and practice? How are various calculative tools being developed and used to measure and represent new values? How do certain discourses come to frame these values, how are they arrived at, and how do they circulate and produce effects in policy and practice? And, finally, through what institutional assemblages are valuation practices promoted and new values articulated?

By studying how valuation processes proceed empirically, these collected chapters aim to understand the deficiencies and possibilities of contemporary economic valuation practices in political, social and environmental terms. We thereby focus on the production of 'value' through the creation of new 'value entities' that can be accounted for, costed and circulated in monetised and financialised forms, such as within a market in which they have a price. Each of the chapters draws on a common framework for studying valuation processes empirically: identifying the calculative devices, calculative technologies, institutional assemblages and discursive framings that go into the process of producing new 'value entities'. In so doing, we join a growing group of scholars interested in interrogating 'value' as something produced and performed through practices that can be traced empirically. This is not to say that values – once produced and performed – do not have real effects

in the world. Indeed, the collected case studies in this volume show otherwise. Rather, this collection affirms that economic values do not pre-exist their measurement or articulation as explanatory entities in their own right, but instead are themselves phenomena in need of explanation.

As we recognise in the next section, we are not the first to assert this. It is important, however, to set this assertion against a background in which economic valuation has come to dominate political narratives of value over the past half-century. In so doing, we can more clearly locate the empirical processes through which this occurred. A number of elements can be identified that suggest an interlinking of economic and environmental thinking in the 1960s and 1970s in ways that were logical but that evolved in ways that were not necessarily foreseen, much less predetermined. A first element can be identified in the development of economic analysis of "social costs" (Coase 1960) and its instrumentalisation as cost–benefit analysis (CBA) as a means of determining whether the aggregate benefits of a proposed initiative outweighed the overall costs. A parallel concern with impacts mediated through the biophysical environment culminated with the notion of environmental impact assessment (EIA). These approaches were initially distinct in that CBA was concerned with effects that could be measured in economic terms and were thus reducible to a single positive or negative figure expressing the balance between the two. In contrast, environmental impact assessment made no claim to aggregate the effects it identified to a single measure, but emphasised plurality in multi-criteria assessment.

The development of environmentalism in the 1970s generated narratives that transformed this separation between the aggregating approach of economics and the pluralist assessment of incommensurable phenomena in EIA. In particular, narratives of a finite planet and fragile ecosystems characterised nature in terms of loss and scarcity. The "limits to growth" (Meadows et al. 1972) projected at a global scale were used to provide an ecological narrative of unsustainable human population growth to explain instances of human vulnerability, most notably in the case of famine following drought in Africa. During the 1980s one response was to construct a sustainability narrative in which ecological security required the elimination of social deprivation (WCED 1987). Another was to extend to the 'problem' of the environment the logic of neoclassical economics. In the latter, the degradation of nature and its ensuing 'scarcity' was a consequence of undervaluing nature: if the value of natural elements such as forests, wetlands, wildlife, etc. could be correctly revealed through prices, then scarcity would be reflected in higher prices and reduced demand (i.e. conservation). In this neoliberal 'counter-revolution' scarcity was removed in so far as the limits of environment could be economically defined, and progressively monetised and sometimes traded (Nelson 2014, 2015). While the privileging of market 'solutions' reflected the neoliberal political domination of the era, the plausibility of market valuation as a route to nature conservation hinged critically on the perception that it provided a means by which society would

be made more aware of the value of what was being lost. So forests' economic valuation was extended from the price of timber to the calculation of equivalent financial benefits derived from non-timber forest products, such as medicinal, fibre and food plants harvested from the standing forest, often with the express aim of demonstrating the greater economic value of leaving timber uncut (e.g. Peters 1996).

In its early manifestations (cf. Pearce et al. 1989), therefore, environmental economics emphasised the importance of finding hidden economic value in order to construct valuations of nature that would counter the financial returns claimed by developers. Such arguments for the economic benefits from nature conservation only worked, of course, if these benefits were actually realised: a matter of 'use it or lose it'. Hence the importance of realising the economic benefits of African wildlife, for example, in terms of revenues from tourism to local communities to counter the foregone benefits of expanding cultivation and livestock grazing. The move from making visible economic values in nature to using such values in making decisions about 'trade-offs' between costs and benefits of alternative activities and ultimately using such values to trade and commodify elements of nature may appear inexorable. Yet the development of markets in environmental commodities, as with all markets, demonstrates the critical role of non-economic factors. As the following chapters show, the work entailed in establishing a value for something, making that value economic, and then making that economic value act like a commodity is extensive and the results are often unstable.

The critical role of non-economic factors may emerge as directly political, or as administrative fiat. For example, it may be a matter of blatant collusion in price-fixing, as in "wetland banking" (Robertson 2004), but more fundamentally the establishment of markets such as emission trading show an interplay between context-specific political expediency and a broader ideological commitment to promote market allocation as a preferred governance mechanism. As documented by Gorman and Soloman (2002) and Lane (2012), the development of emission trading in the US in the 1970s did not emerge from a policy blueprint, but from a need to reconcile contradictory political imperatives of compliance with air quality standards and enabling new industrial development. Local authorities in industrial areas with poor air quality sought to 'offset' emissions from new industry by requiring those responsible for new emissions to achieve reductions either in their existing operations or in those of neighbouring companies. Lane (2012) has observed that the translation of such local arrangements to a policy of emissions trading at a national level required a series of narratives that altered (or re-framed) perceptions of the problem of clean air. Specifically, the political problem of poor air quality which pitted local residents against industrial polluters was re-framed as a problem of aggregate pollution (i.e. tons of pollutants emitted per year) and the efficiency with which this could be reduced. This could only be achieved if mandatory and uniform air quality standards, and penalties for non-compliance such as carbon taxes, could

be portrayed as 'inefficient'. That this was achieved was due to political lobbying by industry who sought to minimise the costs of compliance. The primary goal of improved air quality for residents was thus replaced by a goal of reduced cost of compliance for industry.

This brief reflection on the rapid and radical domination of valuation by economics over the past half-century bears out not only the importance of understanding how values and systems of valuation come about through political process, but also the contingency of such developments on particular historical circumstances. There is thus a historical context to this book in relation to the broader movement of political economy over the last 50 years or so, which has tended to a privileging of economic and then arguably financial imperatives in the organisation of human and non-human affairs. There are specific contexts, spaces and geographies in which valuation processes, which in this book are conceptualised within institutional assemblages, have been increasingly privileged. Moreover, economic values are created by multiple agents in circumstances where economics is not the only thing of concern, and yet economic criteria have grown to dominate many of these valuation processes despite the salience and resonance of other variables. Thus we have set out to explain how this dominance happens, in time and space, in our various case studies. We have also discovered that sometimes it does not, and we return to this alternative finding in the conclusion.

Value, values, valuation

The Oxford English Dictionary defines 'value' as "[w]orth or quality as measured by a standard of equivalence".[1] Beyond this basic definition, 'value' and 'values' have come to signify a multitude of diverse, often conflicting, meanings within different academic traditions. In the interest of space, we do not retrace all of these lineages here (for extensive discussions of value in the social sciences see e.g. Graeber 2001; Lamont 2012; Skeggs 2014; Stark 2009). We are also limited in space in relation to studying the specific trajectories of these considerations of value in each social science, through, for example, the seminal work of anthropologists and sociologists like Pierre Bourdieu (and exchangeable forms of capital), Stephen Gudeman, Jane Guyer, Keith Hart, Mary Douglas, Nicholas Thomas, Marilyn Strathern (in particular, [2000] *Audit Cultures*), Marshall Sahlins and David Mosse. For economists, value is a core concern, and beyond price theory and mainstream economics, where ideas of resource scarcity and distributional matters tend to be dominant, value often has a central place. For example, Marxist economics hinges on a central law of the Labour Theory of Value, where all circulating value is said to derive from workers' labour. Also, in the broad field of economics, heterodox theorists are invariably encouraged to find value beyond the mere price of things to provide an epistemology for sustainability and human-centred development in such concepts as impact investing and the triple bottom line. Because value is such a core

concern in social science we would struggle to cover every contribution in a book this size, while still attempting to offer something new. So instead we offer a more selective account of the theories of value we have drawn on, for reasons of both expedience and relevance, in our own interrogations of value in policy and practice in development, environment and conservation domains. While offering apologies in advance to writers who feel excluded, and for any scholarly deficiencies that might arise from this more selective account, we do propose that what is offered here has a pattern of literature preferences that we feel best suit a study of value at this particular point in time. We will return to this body of work again in the conclusion.

Our collective studies on the current rise of economic valuations draw from a long lineage of work on relationships between economic and governmental values and rational calculation: Weber (1930[1905]) persuasively showed how a "calculating rationality" was associated with the emergence and consolidation of capitalism; Foucault (1991[1975]), 2007) argued that calculative frames and devices that abstract, measure and rationalise bodies and nature are key to the mode of governmentality of the modern state; Deleuze and Guattari (1987[1980]) similarly observed that productive 'striations' of time, space, bodies, nature, etc. are associated with the consolidated apparatus of what they term "State Science". Graeber's *Toward an Anthropological Theory of Value* (2001) is also seminal here. He identifies three "large streams of thought that converge" in the meaning of 'value', these being:

> 'values' in the **sociological sense**: conceptions of what is ultimately good, proper, or desirable in human life; 'value' in the **economic sense**: the degree to which objects are desired, particularly, as measured by how much others are willing to give up to get them; (and) 'value' in the **linguistic sense**, which goes back to the structural linguistics of Ferdinand de Saussure (1966), and might be most simply glossed as 'meaningful difference'.
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> (Graeber 2001, 1–2)

In our explorations of how a particular thing might become subject to calculative processes, and then become subsequently valued differently through that engagement, we seek to work with how these differing conceptions of value perform, relate, condition, reinforce and contradict each other in our different empirical cases.

Before we turn more fully to the epistemology and method guiding the research presented in the remainder of this volume, however, we engage further with some key prior framings of how value is made. It is of course impossible to engage with concerns regarding the making and performance of economic value without also engaging with the Labour Theory of Value (LToV) as presented in the writings of Karl Marx. While we depart somewhat from Marxist understandings of value as a "static category revolving

around capital and labour" (Dussauge et al. 2015, 17), we are alert to the influence of Marx's positioning of value as composed of, and derived from, social relations obscured by the appearance of value as something inherent to commodities. The LToV is potent precisely because it unmasks the fetish of value residing in the objectified commodity set "opposite living labour as an alien power" (Marx 1993[1857–1858], 454). In doing so the LToV draws attention to dimensions of activity, materiality and life that become captured through processes of commodity-making but then hidden from view in the appearance of the commodity. The LToV thus points to both the domains of life and activity from which capitalist (exchange) value is alienated (Taussig 2010[1980]; Holloway 2015), and to the unequal accumulations of surplus value – manifest as both profit and rent – driving the engine of commoditised production requiring this alienation (cf. Luxemburg 2003[1913]).

While some scholars tend to juxtapose new theory as inevitably at odds with classical Marxism, we instead affirm that new empirical work on valuation, including work presented in this volume, builds on and adds to Marxist value theory in important ways (also see Henderson 2013). For example, this work breaks down the fixity of certain economic entities and dyads – such as labour and capital, state and market, private and public – borrowed in Marxism from the classical political economists of the 18th century liberal tradition, with all the associated heuristic characteristics of Modernism. To 18th and 19th century intellectuals, proving neatness, fixity, laws and science was part of the modernist project, and the production of a law around a singular theory of value was Marx's contribution, among others, to that work. Beyond its proclamation as a law, however, Marx's labour theory of value is flawed because its units can only be inferred: the units of socially necessary abstract labour time (SNALTs) required to produce a commodity cannot be exactly measured or known. This immeasurability is shared with its counterpart the *util*, i.e. the base unit of utilitarian economics that hypothetically measures satisfaction (Bichler and Nitzan 2015). Instead, as Bichler and Nitzan summarise, they can only to be known by their effects (2015).

Embracing complexity, relationality or contingency instead requires rejecting the fixed laws of traditional political economy, an observation particularly salient given the complexity of 21st century economic realities (Mandelbrot 2008). As Bichler and Nitzan note of mainstream economics:

> You cannot build an entire social cosmology [economics] on the assumptions of individual rationality, equilibrium and perfect markets – and then blame the failures of this cosmology on irrationality, disequilibrium and imperfections. In science, these excuses and blame-shifting are tantamount to self-refutation.
>
> (Bichler and Nitzan 2015, 67)

Similarly, for the LToV to work as a concept we must accept that all commodity value comes from the application of human labour (in combination with the (re)generative productivity of beyond-human natures

(Gareau 2005)), and that socially necessary abstract labour time emerges magically in an accumulation process that looks familiar to its sibling, the perfect competitive market: only in competitive markets could the generalised and averaged value of a unit of SNALT emerge. The limitations of such a theory have been made manifest in a generation of work from feminist and post-colonial scholars, as well as others, which show the very particular roles of gender, race, power and geography, in structuring markets in particular non-economic and non-competitive ways. Thus, just as we understand real-world markets as constituted by more diverse social processes than allowed by their abstract ideal, so also with value and valuation. Foudationally, since neither utils nor SNALTs, or the assumptions behind their conceptualisation, lead us to know more about value and valuation, we have chosen instead an epistemology that breaks the link to a foundational LToV (or util) that cannot be measured or refuted (on which more below). This approach enables exploratory empirical possibilities (as demonstrated in the chapters that follow), as well as offering a renewed recognition of the interconnections between things, people and other-than-human natures in their co-contribution to that which is and becomes valued.

While we draw from Marx, then, the idea of value as a social relationship, we also draw from the pragmatist tradition a sense that value is not something that exists 'out there' as an entity unto itself, but is rather something that can only be known from the practices through which it is produced or performed. In the pragmatist tradition, John Dewey argued that, strictly speaking, there is no such thing as value but only things possessing "the unique, the experienced, but undefinable, quality of value" and that, moreover:

> [v]alues in the plural, or value in the singular, is merely a convenient abbreviation for an object, event, situation, res, possessing the quality. Calling the thing a value is like calling the ball struck in baseball a hit or a foul.
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> (Dewey, 1923, 617; cited in Muniesa 2012, 25; see also Dewey 1939)

In this perspective, then, the only way that 'value' can be understood is by attending to the practice (or action) of valuation.

The pragmatist tradition of focusing on actual practices resonates with (most) actor network theory (ANT), after-ANT, and assemblage theory analyses of value. For Michel Callon and his followers, for example, value arises through ongoing performance, or "performation", by dynamic socio-technical assemblages or agencements (STAs). Boltanski and Thévenot (2006[1991]) similarly see value (or worth) as arising through ongoing and dynamic (re)enactments requiring continual negotiations and innovations in everyday life. Michèle Lamont (2012) defines valuation as the action of "giving worth or value" through practices of categorisation – i.e., classification, commensuration, signalling and standardisation – as well as of the social legitimation of the categories that thereby arise – through contestation

and negotiation, diffusion, stabilisation, ritualisation, consecration and institutionalisation. Lamont (2012) and other sociological researchers share kinship with this pragmatist emphasis on practices of valuation although follow Bourdieu (e.g. 1993) in approaching the study of valuation (and evaluation) as the study of the cultural practices associated with assigning relative worth within different 'fields', for example economy, politics, law, art or education (also Boltanski and Thévenot 2006[1991]). Attending to the social and cultural negotiations and contestations arising over questions of what constitutes appropriate criteria for valuation and who can be a legitimate judge of value in various fields, are thus central to this approach (Bourdieu 1993; Lamont 2012; Boltanski and Thévenot 2006[1991]).

There are resonances of this performative orientation to value in the geography literature associated with notions of 'political ecology'. More specifically, critical reassessments of the relationships between human society and non-human 'nature' have emphasised both the importance of human subjectivity in the 'construction of nature' (Smith 1984; Cronon 1991) as well as the significance of materialities in accommodating or frustrating the plans of human society (Castree 2002, 2003; Bakker and Bridge 2006). The discussion of the relative agency of non-human nature has sought to avoid an environmental determinism on the one hand and a subordination of nature to human subjectivity on the other, leading to notions of "hybridisation" and "quasi-objects" (Swyngedouw 1996, 1999). For our purposes here, the significance of these discussions is that they locate the qualities – and 'value' – of elements of nature as arising from their relations (or geometries of power) with human society in historically and spatially specific contexts. This understanding of context-specificity of valuation is congruent with that of O'Neill (2007) who asserts that people often value habitats not in ahistorical terms of itemised ecosystem services but through historically specific associations or relationships.These include, for example, childhood memories or a sense of landscapes as manifestations of the lives and identities of particular communities in farming, tin-mining, quarrying or whatever.

Although less concerned with theories of 'culture' and more with attending to empirical parameters, in the American pragmatist tradition 'valuation' also emphasises the actions associated with assigning value/s. John Dewey, a central early thinker in the American pragmatist tradition, thus argued for a focus on valuation as action, process or practice, rather than on value as something with either a real or ideal basis (Dewey 1915a, 1915b, 1923,1939). Such a move, Dewey suggested, can effectively intervene in the dualism of an 'idealistic–realistic' divide, not by choosing one side or the other, but by way of providing an alternative means of understanding, or 'flank movement' (Muneisa 2012), which decentres the idealistic–realistic duality. More specifically, Dewey argued that:

> The situation in which judgement of value is required is not mental, much less fanciful. It is existential, but it exists as something whose

> good or value resides (first) in something to be attained in action and (secondly) whose value both as an idea and as existence depends upon judgement on what to do. Value is 'objective,' but it is such in an active or practical situation, not apart from it.
>
> (Dewey 1915a, 516; quoted in Muneisa 2012, 26)

The pragmatist approach thus locates both the reality and ideation of value in empirically traceable action, suggesting that the two are not entirely separable in practice. In modernity, traceable acts of valuation and the ideas by which they are infused are frequently associated with innovations in measurement, standardisation and numerical attributions of monetary worth. Weber (1930[1905]; also Foucault 1991[1975]; Federici 2004) famously emphasised this impetus of 'calculative rationality', arguing for its material effects in terms of shaping society and economy. In this view, calculative rationality and the apparatus of calculation with which it is entwined are important in four ways in creating values that come to matter: first, by acting historically to generate consistent patterns in the distribution and organisation of wealth; second, by extending an emphasis on particular forms of value and value-making activities/institutions (namely money as measure of all value); third, by amplifying particular subjectivities, including that we are self-interested rational accumulators of particular forms of value, and that we have no kinship with non-human nature; and finally by fostering a spectrum of exclusions, inequities and environmental degradations. Our work builds on this tradition by examining the specific valuation technologies and processes which contribute to these causal and consequential effects of valuation. Studying calculative rationality enables us to identify different calculative devices and technologies, notional values and value framings and the ways in which these are used to incorporate ever more things into socially articulated markets and spaces, reconstructing them as new 'valued entities' with a numerical or calculated worth.

With these diverse, but interrelated understandings of value in mind, our collective project in this volume is to interrogate the ways in which value in the contemporary moment is produced, enacted and circulated in the world. These performative approaches amplify the insights of the LToV by disassembling, and thereby clarifying, the world-making actions of multiple calculative devices, institutional practices and structuring value discourses that in combination make new economically valued units that often can also be traded as commodities. The ethnographic and data-rich analyses that such approaches encourage illuminate not only the calculative and other machinations underscoring the exchange values that become visible in variously marketised structures of action and decision-making, but also alternative rationalities that may contest and creatively subvert them (Taussig 2010[1980]). As such, an emphasis on how new economic value is made can assist with making visible some of the practices of assemblage that bring together multiplicitous actors, materials, organisations, institutions and calculative devices around particular value(d) entities, as well as some of the practices of contestation through which these entities might be unmade.

Research protocol for creating values that matter

Having outlined the above key approaches to the creation of values that matter in the contemporary moment we now proceed to delineate our specific protocol for researching the creation of values that matter in our cognate case studies in development, conservation and environment domains of value. As indicated briefly in Chapter 1, at the beginning of our four-year programme of research, we engaged in a collaborative process to design a research methodology to guide our case-study research without dictating how research should be conducted in each case context. All of the chapters that follow draw on this protocol to varying degrees. It involves the identification and consideration of three key interacting elements of valuation processes in each case, namely calculative technologies and devices, institutional assemblages and practices of assembling, and discursive framing (also see Corson et al. 2013; Sullivan forthcoming).

1. Calculative technologies and devices

We understand a calculative *device* to be a specific package or technique, such as a scorecard or equation, and a calculative *technology* to include the purpose and context in which a calculative device is used. Calculative devices are the statistical packages, software programs, equations, pro formas, audit technologies and so forth that can be used to measure a thing or person in some attribute. For example, the International Finance Corporation (IFC) employs a calculative device, the Development Outcome Tracking System (DOTS), in order to measure the development impact of its investments in private sector development. Here the DOTS scorecard (the indicators and their weightings) is the calculative device; while what is being done, i.e. development impact assessment, is the calculative technology. This impact assessment is done in a particular way, within specific institutions (normally by consultants contracted to the IFC), which together make up an institutional assemblage for performance standards and safeguarding within the private sector development industry. This assemblage promotes particular understandings, or discursive framings, of the process, which in this case can be summarised as deriving from a world view in which economic growth is valued, and consultants' expertise is a professional and technical attribute understood as guaranteeing 'development' value. In emphasising this constitutive combination of calculative device, calculative technology, institutional assemblage and discursive framing, our cross-case research protocol provides a means to empirically explore, in this example, development impact valuation (see Chapter 3 this volume; also Bracking and Ganho 2011). What emerges at the end is a new, partially abstract 'valued entity', for example 'private sector development'.

The case-study areas we explore in this volume thus assist with identification and investigation of the 'real world' effects on human and

environmental wellbeing of contemporary and expansionary calculative and market-oriented technologies as they 'render technical' previously uncalculated domains of being (cf. Li 2007a, 263). All our case studies contain a valuation process embedded within a 'calculative technology' which probably incorporates one or more specific calculative devices that act to create new numeric value entities in pecuniary and non-pecuniary terms. A pattern emerges across our cases in that many of the valuation processes we are studying act to replace or obscure non-pecuniary prior value with values in terms of price (for new markets cases, see, for example, Chapter 7 by Carver and Sullivan in this volume) or costs (as in the cost–benefit models developed around HIV/AIDS treatments and allowable death in Machingura's case research and for costing climate change in Watt's research (Chapters 4 and 8, respectively, in this volume)). Each of our case studies focuses on the production and performance of 'value' by mapping the valuation process in which new 'value entities' are made, and how these can be accounted for, costed and sometimes also circulated as commodities in monetised and financialised forms.

In our volume new value entities include 'allowable death', carbon credits, biodiversity offsets, water allowances and development impact scores. The important contribution of the concept of 'calculative technologies' is that it provides a way of critically theorising and investigating how new entities such as these are able to be created and *accounted for*, such that they can assume 'market values'. As stated above, our research draws closely on the performative turn in economics and economic sociology. This means that rather than exploring the existence and implications of an exogenous 'economic x' (as in conventional economics), we focus on *how* 'economic x is made'. In our case studies, we are applying the idea of a marketisation process, to understand the way that a value comes into being, and why it may, or may not, end in pricing, and possibly further financialisation. Part of what we do collaboratively is to show how newly created, quantified and variously marketised value entities have emerged, so that we can draw comparisons and conclusions across our different case studies about how values are made *in situ*. An initial typology of the range of calculative technologies in use can be made by broadly distinguishing them by what they produce. These outcomes include quantified *numeric values* that may become priced and financialised (e.g. carbon offset credits), *notional values* as computed in statistical and management tools (e.g. development impact assessments or quality of life adjusted years), and more qualitative *value framings* that frame and create the social and/or ecological categories and relationships that facilitate their formal consideration in numeric or notional terms.

In these categories of calculation technology a calculative device is usually deployed so as to settle and assign value. At the same time, and as highlighted in the notion of 'value framing', the process of value assignation is also influenced by social stigmas and cultural perspectives. It may include various forms of prejudice such as racism, misogyny and homophobia, as

well as (more positively) being guided by principled and codified frameworks shaped by discourses regarding rights, humanitarianism and environmental care. All these influences play a part in the emergence of identifiable 'value entities' in our cases. These are the social framings or social categories that can be assigned to a person or an environmental unit, such that they become treated as, for example, an 'aid recipient', 'project affected person', 'orphaned and vulnerable child', 'HIV/AIDs affected person', 'biodiversity offset unit', 'carbon credit' and so on. To clarify, then, it is not the person or unit in themselves who becomes the entity that is valued, but the social or environmental category that has been formed through the processes described above, which may then attract an income stream, such as income from a development intervention, or be assigned a financial cost to be minimised.

It becomes quickly clear, however, that temporal, spatial and virtual processes can rapidly change the type of calculative technology in use. Moreover, movement between and among these various different calculative technologies can produce, in turn, a valued entity with quite different characteristics. These movements between categories are conditioned by actors who may encourage, resist or attempt to re-frame the valuation process. Our chapters illustrate as well these fluid, moving frontiers and the contested and unclear value renderings to which they may give rise.

In each of our case studies, then, we have researched the social articulation of value by focusing on the importance of emergent value entities in terms of:

- *how* these new value entities come into being in each of our case studies;
- *what* (calculative and value) assumptions are required on the part of their protagonists to enable the creation of specific value entities. For example, the possibility of creating a marketable biodiversity offset for the mitigation of environmental harm requires a host of assumptions and constructs regarding 'the nature of nature', accompanied by a whole other set of assumptions regarding things like development pathways, what it means to be human, the appropriateness of markets for best allocating environmental health and harm, etc. Similarly, in the case of water valuation, there appears to be an overarching need to create the notion of scarcity in order to introduce pricing, even in contexts where material scarcity is not apparent;
- the *implications* of these new circulating and value-accumulating entities for the problems they are constructed to address/redress, for the distribution of wealth and for the design of progressive policy.

We thus arrive at a core research question that concerns how calculative rationality conditions the types of calculative devices and technologies in use, and how the social articulation of these, in the full context of place, leads to emergent value entities with differing characteristics. We explore these processes as moving subjects, where the nature of the relationships

between notional value and its framing, social categorisation, commodification and financialisation and how these processes work together and in contradiction creates contested and morphing value entities. Since calculative devices and technologies do not exist as *deus ex machina*, but arise in social processes, a key insight from the literature on socio-technical arrangements (which are specific, material and empirically researchable configurations of people, devices and things) is the need to understand the institutional arrangements in which calculations are made. The first means to do this is to map these institutional arrangements, and thus the second key node of our original research protocol was to recognise the importance of institutional assemblages.

2. *Institutional assemblages and assembling*

In the study of value and valuation processes, the case for thinking about valuation in terms of the distributed agency of an assemblage has been well established, perhaps most prominently by Michel Callon (e.g. Callon 1998, 2007; Çalışkan and Callon 2010) in his call for attending to the socio-technical agencements (STAs) through which markets are formed. The word 'agencement', generally translated as 'assemblage' in anglophone social theory, indicates a coming together of things "which are simultaneously human and nonhuman, social and technical, textual and material—*from which action springs*" (MacKenzie et al. 2007, 14–15, emphasis added). This last clause is critical for the current discussion as it underlines the point that this coming together of diverse things is not simply one mode through which agency is possible, but that it is "a necessary and prior condition for any action to occur" (Braun 2008, 671; see also Dewsbury 2011). Thus in the concept of agencement the individual, purposeful human actor is not only displaced as the sole possessor of action and agency, but no action is considered possible without the dynamic articulation or assembling of a diverse arrangement of people, beyond-human natures, things, texts, technologies and so on. The agency of people and things, in other words, is necessarily relational.

Although some versions of assemblage thinking focus mainly on the tendency of assemblages towards emergence, multiplicity and indeterminacy, this is only part of the story (Anderson and McFarlane 2011, 124). Assemblages may also tend towards stabilisation, normalisation and repetition (Dewsbury 2011). In their foundational conceptualisation of the dynamics of assemblage, for example, Deleuze and Guattari (1987[1980]) identify a twinned movement of lines of becoming: on the one hand there are lines of articulation, involving the coming together of heterogeneous things in an encounter through which (material, metaphorical, virtual, etc.) territorialisation occurs; on the other, there are lines of flight through which things are dispersed and the territories established through encounters dissolved, or deterritorialised (Mennicken and Miller 2012). Not all assemblages

exhibit equal tendencies towards articulation/territorialisation and flight/deterritorialisation. The particular way in which different assemblages come to be configured, moreover, may set up or constrain different capacities and possibilities for future action (e.g. Callon 2007, 320). Indeed, Foucault's concept of apparatus (*dispositif*) – which as Legg (2011, 131) suggests may be thought of as a type of assemblage "prone to … re-territorialisation, striation, scaling and governing" – has been central to our understanding of the relevant assemblages in our various case studies. According to Foucault an apparatus comprises the:

> discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions … assembled to address an 'urgent need' and invested with strategic purpose.
>
> (Foucault 1980, 194)

Through such stabilised assemblages/apparatuses the particular, emplaced relations of value can become stabilised, repetitive *and therefore appear* to be the inevitable result of external social or economic "structures" (Law 1994). What is key here, however, is that despite these appearances, as Hinchliffe et al. (2007, 260–261) remind us, "such stabilities are themselves achievements which require all manner of human and nonhuman actions" and, as such, are orderings that are not imposed by universal laws or abstract forces external to the relations through which they are enacted. Instead, orderings arise from the relational arrangements and practices both contained within and excluded from particular assemblages.

In thinking about the different possibilities of assemblages as prone to deterritorialisation, immanence and lines of flight as well as to 're-territorialisation, striation, scaling and governing', it is useful to consider Manuel De Landa's (2009) figuring of assemblages as 'possibility spaces': dynamic relational spaces ordered by different topological rules that set the conditions for what forms and actions are possible. These conditions are not determined in advance, nor are they inevitable or immovable once in place. In contrast to essentialised notions of space with set properties:

> the capacities of an assemblage are not given, that is, they are merely possible when not exercised. But the set of possible capacities of an assemblage is not amorphous, however open-ended it may be, since different assemblages exhibit different sets of capacities.
>
> (De Landa 2009, 29)

Through this line of reasoning, the assemblages that constitute new markets and market logics for things previously outside of pecuniary systems of valuation can be said to set the possibility spaces of valuation in terms

of economic capacities for calculating value as price. Indeed, arguably neoliberal governmentality can itself be seen as an assemblage through which:

> [t]he surface of contact between the individual and the power exercised on him, and so the principle of the regulation of power over the individual, will be only this kind of grid of homo economicus. Homo eonomicus is the interface of government and the individual.
>
> (Foucault 2008, 252–253)

3. Discursive framing

The third key dimension of our research protocol emphasises the *discursive framing providing* the systematic metaphorical "authorising knowledge" (Li 2007a, 2007b) for the acts and processes or calculation and assembling highlighted above. Every socio-technical arrangement (in Callon's terms) made up of the calculative technologies and devices shaped and applied through institutional arrangements also has an important, though frequently intangible, component guiding the ways that actors understand what is going on, their activities and behavior, and how they frame (Lakoff 2010) and understand valuation processes as a whole.

This link between knowledge and power and the idea that understanding is malleable by political processes has long informed political economy and manifested itself in Gramscian notions of hegemony. Over the past half-century it has become widely applied to investigation of the role of science in society via science and technology studies (Jasanoff 2004) but particularly in the contested arenas of environmental science and the analysis of how competing scientific opinions are constructed by discourses promoted through knowledge alliances (Hajer 1995, 2005; Stott and Sullivan 2000; Dryzek 2013). Watts and Peluso (2013) identify environmental discourses as a key part of 'regimes of truth' through which particular visions of environment and society are both formulated and legitimated. Thus, how one defines, or frames, social and environmental problems and goals will set the bounds of what are appropriate pathways to 'sustainability' (Scoones 2016) and through which measures (calculative technologies) we should assess progress along the chosen path.

Tensions and tendencies in performing value

The ways in which assemblages order socio-ecological spaces – and their differing capacities for doing so – can be expressed through the concept of performativity. Although economisation has been a central topic for exploring performativity, the concept is more widely relevant to studies of valuation of various types (see Çalışkan and Callon 2009, 2010). As Muniesa explains, central to performativity is the "idea of signification as act (to signify is an active

process) and of reality as effectuation (to effect is to bring reality about)", two ideas he links to the pragmatist tradition in philosophy (Muniesa 2014, 16). Central to pragmatism and to performativity thus formulated is a close attention to situated practices. Muniesa points in particular to John Dewey's studies of value (1915a, 1915b, 1923, 1939), wherein he argued that value cannot be understood as a thing unto itself but instead can only be observed as a quality assigned to things (see above). That is, if something has a value (regardless of the register of that value – e.g. pecuniary or non-pecuniary) it is only because it is actively being valued. In short, valuation (as signification) is an act and the action of valuating things (achieved through the distributed agency of assemblages) effects a reality of value.

For Callon (1998) performativity signals the ways in which economics and economists do not describe a pre-existing reality – 'The Economy' – but instead participate in its making, through their implication in the formatting of the relations between elements within assemblages that constitute markets and other economic entities (Callon 1998; MacKenzie 2009; MacKenzie et al. 2007; Mitchell 2008; Muniesa 2014). In other words, the field of economics does not simply observe and describe the economy, but rather "performs, shapes and formats the economy" (Callon 1998, 2; Fourcade 2011; see also MacKenzie 2006). Importantly, Callon's work in performative economics highlights the point that performativity is not a one-off achievement, but involves ongoing movement – ongoing ordering and reordering. As Butler (2010, 149) explains in her reflection on economic performativity, the apparent separation of the economy from society does not happen just once (it is not locatable in history), such that "to say that the market is performatively produced is not to say that it is produced *ex nihilo* at every instant", but rather the performance of this separation involves ongoing reiteration. Once again we are reminded that arrangements that appear stable "are themselves achievements which require all manner of human and non-human actions" in each moment (Hinchliffe et al. 2007, 260–261).

One area of work that has been central to thinking about the performativity of economics relates to economisation and its sub-process of 'marketisation'. Economisation refers to the general framing of certain things and processes as formally economic – a process central to all of our case studies. Marketisation, meanwhile, refers to a specific version of economisation through which markets – and all of the physical and ideational infrastructure they require – are performed. Critically, marketisation involves defining and valuing entities that can be traded (Çalışkan and Callon 2010), actions that are especially relevant to our cases of new markets for water, carbon and biodiversity. In the process of this defining and valuing, a divide is enacted and reproduced between "the 'things' to be valued and the 'agencies' capable of valuing them" (ibid. 5). As all entities are understood here to have certain capacities depending on their relational entanglement with other entities, those that are to be valued for exchange in this divide must first have their agencies 'pacified', such that they can be transferred as

property (ibid.). On the other side of this enacted divide are those entities with the capacity for calculating the value of that which is pacified (ibid.). Which entities are pacified and which are enacted as capable of pacifying is a matter of the unequal distribution of power within market socio-technical assemblages (STAs), as explored in greater detail below. For now, however, we reinforce the point made above that assemblages, including the STAs through which markets are enacted, may be formatted in certain ways to constrain some of the capabilities they contain. Again, assemblages can be both lively, unpredictable sites of transformation and sites of stabilised, ordered relations.

In the case of markets, the stabilisation and reproduction of relations ordered according to certain economic logics is performed by entities that successfully assert their ability to calculate values and thereby to define other, pacified, entities. Thus when it comes to market encounters, Çalışkan and Callon (2010, 14) write that:

> markets involve a series of multiple encounters and overlapping processes of calculations. Contingencies certainly play a part, as do the initiatives taken by agencies and the unpredictable movements of goods which overflow and follow unexpected trajectories. Yet encounters are not produced haphazardly. Like goods and agencies, they are also framed and formatted by a series of devices.

Chief among the various devices at play in processes of marketisation are calculative ones. Calculative devices – mathematical equations, scoring systems, indicators and so on – play a central role in the creation of new markets and the application of market logics to 'non-market' fields of activity, as shown in the case studies that follow. Calculative devices, then, effectively pacify things by formatting them into potentially equivalent units that can be exchanged.

Just as there is a danger of overemphasising the dynamic, emergent tendencies of assemblages however, there is also a danger of overemphasising stability and repetition in market STAs. In order to achieve scalable economic values, many things – unique aspects of particular ecosystems, the social and political contexts of development projects, individual human subjectivities – must be excluded from the calculative and discursive frame. For example, the STA to produce a new road or mall often acts to exclude persons who may informally live on the affected land or use it for grazing, and while the attempt is made to exclude these people from value considerations, they can often disrupt the STA and the construction process if they choose to. While this is an obvious example, STAs order, limit and privilege different types of knowledge and practice in complex ways. While STAs enact and perform certain calculative agencies capable of producing scalable effects and formatting relations according to market logics, in order to do so, certain things need to be emphasised within the frame of markets and

others left out of this frame (for more on this structuring significance of framing, see Sullivan and Hannis 2015). As Hinchliffe and colleagues (2007, 272) contend, STAs striate spaces and format the relations they enact such that "certain things gain in significance and other things can drop out of the frame of reference". In conventional economics, those entities which are left out of market calculations are referred to as externalities. The economic imagination of externalities is one that revolves around the categories of costs and benefits: if something is left out of a market it is either a cost or a benefit to some party outside that market. In recognition that many of the things left out of markets cannot be readily understood as either costs or benefits – indeed, by virtue of their being left out of the frame many have not yet been subject to the processes of economisation by which they would be framed as such – Callon deploys a new term: 'overflows' (e.g. 2007). Those things that drop out of the frame of reference, or are purposefully left out of the frame (as is often the case, cf. Igoe 2014), have not been incorporated and thereby pacified. They therefore maintain their prior capacities to affect others and produce effects in the world, as for example in the effects of waste disposal by humans, the impacts of which are mediated by ecological processes. As such, overflows can become sites of lively agencies that, on occasion, can destabilise the very markets they were framed out of to begin with, so as to have 'counterperformative' effects (MacKenzie 2006; Nel 2015). Historically, the poor and vulnerable, non-humans and non-protected natures have often been consigned to the 'overflow' category of development and market capitalist STAs, which is a reason why valuation processes offer manifest opportunites for resistance to unjust marketisation.

One source of this counterperformativity is that overflows are often non-scalable: they cannot be expanded without the transformation or adjusting of elements and/or the relations between them (Tsing 2012). Indeed, this is often why they are left out of the frame to begin with. Another, sometimes related, source of counterperformativity is that overflows may be emergent, their arrival not predicted or predictable in advance, for example those that arise from unstable social conditions (e.g. Nel 2015) or from the irreducible complexity of ecosystems (Braun 2008). A third involves the economisation of externalities such that they become reconstituted within markets, as has occurred with the application of market-based mechanisms for resolving allocation issues in the distribution of environmental harms.

Despite the potentialities of overflows eventually becoming destabilising, however, new markets and market logics at the frontiers of valuation appear to be gaining, not losing, momentum. The indefinite nature of species and ecological relationships is almost completely absent from high level policy debates on biodiversity offsetting, which focus instead on developing ever more complex technical equations for establishing the commensurability of habitats. Increasingly dramatic evidence of anthropogenic climate change in the form of dramatic weather-related catastrophes (e.g. storms, floods, droughts and so on) and consensus that not enough is being

done to slow its progress, has yet to destabilise carbon markets (albeit that they are currently characterised by low prices, turnover and liquidity). Similarly, criticisms of the rise of market logics in international humanitarian aid have not led to calls to find a new logic but rather to calls for improved planning and measurement technologies that include beneficiary voices (Krause 2014). The ability of valuation assemblages to resist or absorb any counterperformative effects from the overflows they create indicates a certain robustness derived from the unequal power relations within and between various assemblages.

If the objects of valuation practices have such lively capacities for overflowing the frames of marketisation, then, why is it that the latter not only seem to persist, but are seemingly ever advancing? Why is it that the representation of value in economic or market terms "supports some stakeholders' interests, while obscuring and abjecting those of others" (Bracking et al. 2014, 4)? To answer these questions, it is necessary to attend to the matter of power. Although agency is distributed through heterogeneous assemblages, power is not distributed equally within or between assemblages (Bennett 2010). As Marion Fourcade has demonstrated, the mere existence of an economic theory, model or calculative device does not mean it will have performative effects (Fourcade 2011). Some calculative devices are more successful than others, often as a result of their enrolment in powerful, i.e. empowered, STAs. An STA with more advanced calculative capacities and/or strong institutional involvement will have more power to define value(s) than one with relatively poor calculative capacities or weak institutional involvement. Thus inequalities in markets result, as Çalışkan and Callon (2010, 13) put it, from "the unequal power of calculating agencies that loop back to reinforce themselves. Due to these asymmetries, the most powerful agencies are able to impose their valuations on others and consequently to impact strongly on the distribution of value".

Such asymmetries are evident where the logic of markets is pushed ever further into the frontiers of valuation, framing aspects of human life and the non-human world not previously subject to market values in terms of price and costs. Those aspects of the people, places and things to be assigned economic values that resist such representation (for example because they are nonscalable in nature) are framed out of calculations, becoming overflows. In some instances these overflows may threaten the stability of economic valuation systems, as when it becomes obvious that a particular species will suffer from offsetting or the impacts of a development project will include clear harms and, as a consequence, sufficient resistance is generated to challenge the valuation systems producing these effects. In such instances overflows can become counterperformative. But in such cases the STAs producing economic values also tend to respond iteratively. The economic values they had previously produced do not simply dissolve in the face of resistance, but instead are adapted, or else new, more effective calculative technologies developed to (re)legitimise these values and thereby manage overflows more effectively and evade their potentially counterperformative effects (Callon 2007).

Note

1 This definition pertains to value the noun. The verb 'to value' is defined by the OED as "To estimate the value of" (see www.oed.com/search?searchType=dictionary&q=value&_searchBtn=Search).

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