Chapter 6
Ecosystem Services—A Key Step Forward *or* Anthropocentrism's 'Trojan Horse' in Conservation?

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Introduction

As an ecologist, I well remember when the Millennium Ecosystem Assessment came out in 2005 (MEA 2005). I found it exciting, as here was a definitive report of the United Nations Environment Programme (UNEP) that showed that humanity was 'living beyond its means'. It focused on the term 'ecosystem services' (here truncated to ES). It seemed promising, for here was a term (grounded in environmental science) that showed how society *depended* on all the services and benefits nature provides us for free. It seemed to provide another argument which environmentalists could use to push for the conservation of nature—because society fully relies on nature to survive. Many environmentalists thought that the MEA would 'wake up' society, that society would at last comprehend that it could not (as it were) saw off the branch it rested on. However, it is now 13 years since the MEA came out, and the environmental crisis has worsened. Environmental indicators are all in decline, as the 6th mass extinction event in the history of life on Earth accelerates—due to human actions (Wijkman and Rockstrom 2012; Ceballos et al. 2015; WWF 2018; GFN 2018). Since the MEA put ES in the spotlight, they have been much discussed, and as of April, 2017 over 17,000 papers had been published with the term in the paper's title, abstract or keywords—over 2800 in 2016 alone (Costanza et al. 2017).

As I became more interested in ecological ethics, I started to look at ES from different perspectives, and to question whether the concept was truly the best approach to retaining the diversity of life on Earth. This chapter will consider whether ES are a good idea for conservation, and whether they consider (or help reconcile) ecojustice and social justice. Alternatively, are they a 'Trojan Horse' for anthropocentrism within conservation?

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Definitions

The functioning of ecosystems in terms of providing humanity with what are now called 'ecosystem services' was first described in a US government report on 'Man's Impact on the Global Environment' (SCEP 1970). It listed nine services that would decline if there was a decline in ecosystem function. This was slightly expanded by Holdren and Ehrlich (1974). The services ecosystems provide humanity were subsequently referred to as 'public services of the global ecosystem' (Ehrlich et al. 1977) and 'nature's services' (Westman 1977). Finally, it was termed *ecosystem services* by Ehrlich and Ehrlich (1981). 'Natural capital' was another idea coined by Vogt (1948) and further developed by Schumacher (1973), Herman Daly and Robert Costanza (e.g. Costanza and Daly 1992), and Hawken et al. (1999). The ecosystems that provide ES are seen as 'natural capital', using the general definition of capital as a stock that yields a flow of services over time (Costanza and Daly 1992). The Natural Capital Coalition similarly defines it as: 'the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people' (NCC n.d.). 'Critical natural capital' has been defined as natural capital which is responsible for important environmental functions (for humans), and which cannot be substituted for (Ekins et al. 2003). In other words they are ecological assets essential for human well-being or survival (Pearce 1993). However, defining a subgroup of natural capital that is critical for human use undermines the idea that total natural capital must remain constant, as argued by Costanza and Daly (1992).

Daily (1997: 3) defines ES as the: 'conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life'. They maintain biodiversity and the production of ecosystem goods such as seafood, forage, timber, biomass fuels, fibre, medicines and industrial products (ibid). Costanza et al. (2017) define them as the ecological characteristics, functions, or processes that directly or indirectly contribute to human wellbeing: that is, the benefits that people derive from functioning ecosystems.

The Millennium Ecosystem Assessment

The term 'ecosystem services' really came into vogue with the 2005 Millennium Ecosystem Assessment (MEA 2005) written by 1360 experts from 95 countries. The term sought to encapsulate the idea that nature provides essential services to humanity that we depend on. Basically, ES as a term highlights what is obvious to any ecologist (if not to society), that humanity is *fully dependent* on nature. The MEA (2005: v) stated:

> The human species, while buffered against environment changes by culture and technology, is fundamentally dependent on the flow of ecosystem services.

Figure 6.1 shows how the MEA (2005) saw ecosystem services relating to human well-being.

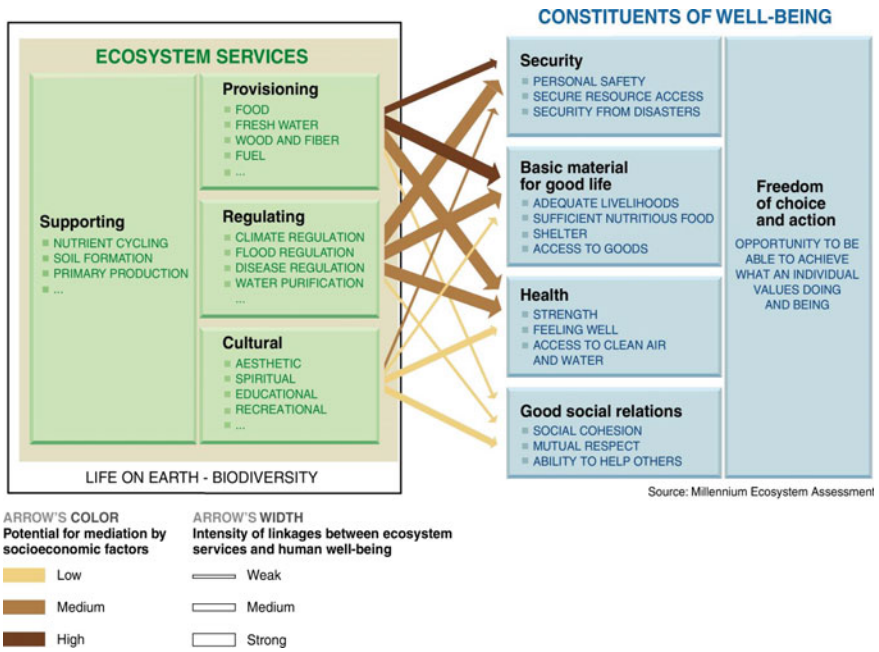

Fig. 6.1 The relationships between ecosystem health and human well-being (*Source* MEA 2005)

The MEA noted that few ES have been the focus of research, and thus the data is often inadequate for their detailed global assessment. It split ES into 31 topics, organised under four types: *provisioning services* (products obtained from ecosystems); *regulating services* (benefits obtained from regulation of ecosystem processes); *cultural services* (non-material benefits); and *supporting services* (those necessary for the production of all other ES).

The MEA (2005) showed true leadership by recognising 'cultural ecosystem services' as a category, even though they don't provide physical benefits. Small et al. (2017) argue that more correctly these should be called 'non-material' ES. Many religions (and also many 'non-religious' people) attach spiritual values to ecosystems and wild places (Washington 2018a). People value the 'sense of place' that is associated with recognized features of their environment (ibid). The font of human creativity and art is tied up with a deep spiritual bonding to place, and a sense of wonder at life and the Universe (Berry 1988; Curry 2011). At a fundamental level people's spiritual connection to nature deserves recognition as something not only necessary—but *essential* (Washington 2018a). Their inclusion in the MEA showed an implicit (if unstated) understanding that the roots of the environmental crisis are tied up with our worldviews and ethics. Such non-material values have been called 'existence values' and 'warm glow values' and are rightly considered to be ES (Davidson 2013). However, Chan et al. (2012) note that the current ES framework is essentially set up for material values, and that non-material values really require a

new vision and new methods. However, we should also remember that non-material benefits remain benefits to humanity that nature provides, and hence do not coincide with *benefits to nature herself*. They do not in fact acknowledge the intrinsic value of nature to exist for itself, nor do they express our moral duties towards nature (Davidson 2013).

Ecosystem Services and 'TEEB'

Six years after the MEA, 'The Economics of Ecosystems and Biodiversity' or TEEB (a project run by UNEP) modified the list of ES down to 22 topics (Kumar 2010). The 'provisioning' and 'regulating' services are much the same as in the MEA. The major changes were in 'cultural services', which became 'cultural and amenity services', and in 'supporting services', which was replaced by 'habitat services'. The cultural services category was also substantially reduced, through omitting 'sense of place' and 'knowledge systems'. Spiritual and religious values became just spiritual 'experience'. The inclusion of 'amenity' in the new title 'cultural and amenity services' gives an indication as to where TEEB was coming from philosophically, as 'amenity' is about *human* use and comfort. Values in TEEB other than monetary values received only token status (less than one page on 'intrinsic value'). So TEEB represented (possibly unwittingly) a strengthening of anthropocentrism in terms of the discussion of ES. As an ecocentric ecologist, I find the original MEA (2005) list of ES a more holistic, ethical, and understandable approach to ES than those of TEEB.

State of Play of Ecosystem Services

So what is happening to ES? The MEA (2005) noted that human use of all ES is growing rapidly. Half of provisioning services such as food and water supply, and 70% of regulating and cultural services were being degraded or used unsustainably. Overall it concluded 60% of ES were being degraded or used unsustainably (ibid). Many ES were being degraded primarily to increase food supply. Take a moment to sit back and think about this. These are the categories of the essential products and processes that ecosystems provide humanity. However, half of the products ecosystems provide us, and 70% of the regulating services (and also cultural services) are in decline, being degraded or used unsustainably. The MEA came out in 2005, and this single statement should have rung (and continued to ring) alarm bells across society. However, the message has not got through, or if it was heard it was not understood. The reason it was not understood is likely due to society's ongoing ecological ignorance (Orr 1994; Washington 2013), plus the dominant anthropocentric worldview, and our capacity to *deny* unpleasant realities (Washington 2018b).

The MEA concluded that degradation of ES could increase significantly during the first half of the century and stop achievement of the Millennium Development Goals (now the Sustainable Development Goals). Any progress achieved in addressing these goals of poverty and hunger eradication, improved health, and environmental sustainability was deemed unlikely to be sustained if most of the ES on which humanity relies continued to be degraded (MEA 2005; Kopnina 2016). The degradation of ES is harming many of the world's poorest people, and is sometimes the principal factor *causing* poverty (Washington 2013). The reliance of the rural poor on free ES is rarely measured and often overlooked. As human well-being declines, the options available to people to enable them to regulate the use of natural resources (at sustainable levels) also declines. This increases the pressures on ES, and can create a downward spiral of increasing poverty and degradation of ES (MEA 2005; Costanza et al. 2017). The MEA also noted that both economic growth and population growth lead to increased consumption of ES.

The main problem (TEEB concluded) was that society does not think about or *value* ES. ES are seen as natural capital assets not included in our national accounts, and economic indicators such as GDP don't measure their degradation (MEA 2005). Most resource management decisions are influenced by ES entering markets, and non-market benefits are often lost or degraded (MEA 2005). Many ES (such as purification of water, regulation of floods or provision of aesthetic benefits) don't pass through markets and are largely unrecorded. The non-market benefits of ES however are often high, and sometimes higher than the marketed benefits (MEA 2005). The authors of TEEB argued that the lack of progress to protect ES after the release of the MEA stemmed from the failures of markets and systems of economic analysis and accounting (notably GDP) to capture values of ES (Kumar 2010). There are no markets for the largely public goods and services that flow from ecosystems and biodiversity, and so there are no established 'prices'. TEEB noted that this is in fact 'market failure', as markets exist only to trade 'private' claims (Sukhdev 2010).

Valuing Ecosystem Services—The Key Debate

So how do we value ES? Daily (1997) explained that ES are absolutely essential to civilisation, but modern urban life obscures their existence. She concluded ES have *infinite use value*, because human life could not be sustained without them. However, the actual assigning of value to ES may arouse great suspicion, and for good reason, Daily concluded. This valuation involves resolving fundamental philosophical issues, such as the underlying basis for 'value'. This is a debate that has continued to the present day, and is arguably a key cause of the environmental crisis (Curry 2011; Rolston 2012; Washington 2018a). The MEA (2005) touched on this issue, while TEEB (Kumar 2010) gave it more coverage. TEEB argued that abstaining from explicit valuation (on apparently valid scientific or ethical grounds) often amounted to no more than an acceptance of someone else's implicit valuation, which is then used to determine environmental trade-offs (Sukhdev 2010).

The above statement at first glance sounds reasonable, but the issue is more complicated than it suggests. TEEB argued that economic valuation of ES was both necessary *and* ethical, and that 'shadow prices' can and should be calculated and presented (Sukhdev 2010). TEEB argued that so deep-seated is modern society's inherent market-centric mindset, that the mere device of demonstrating economic value for ES can become an important strategy for positive change (Sukhdev 2010). TEEB felt it sufficed at times just to recognize value (be it intrinsic, spiritual or social) to create a policy response favouring conservation or sustainable use (Sukhdev 2010). Many of the authors of TEEB accepted that it is not a risk-free exercise to demonstrate value by deriving and propagating 'shadow prices'. There is always the risk that misguided decision-makers or exploitative interests may want to 'use the prices for the wrong ends' (Sukhdev 2010: xii).

TEEB observed that the common metric in economics is *monetary* valuation, so accordingly they used this. However, it should be emphasised that this is accepting the arguments and assumptions of neoclassical economics. One chapter of TEEB believed that the reliance on this has plagued many ES assessments, failing to show values that are critical to understanding the relation between society and nature (De Groot et al. 2010). I share this concern. Another chapter of TEEB acknowledged that economic valuation functions as a system of 'cultural projection' which imposes a way of thinking and form of relationship with the environment, and reflects particular perceived realities, worldviews, mind-sets and belief systems (Brondizio et al. 2010). They note also that economic values are not objective 'facts', nor do they reflect universal truths (ibid). TEEB however concluded overall that the right ethical choice was to compute these imperfect valuations for society to use. This is the heart of the issue—is this *actually* the 'right' ethical choice? They believed valuations were a powerful feedback mechanism for a society that has distanced itself from the biosphere, upon which its very health and survival depends. However, valuation can contribute to the creation of a 'commodity fiction' or Western construct that nature is pure materiality (Brondizio et al. 2010). The danger of this commodity fiction is that the commoditized environment becomes a contrived artefact of itself, as ecosystems and biodiversity can be owned and traded in the market system for money (ibid). Brondizio et al. (2010) thus understand that this is the *commodification of nature*, one that can remove non-material valuation of ES altogether out of the equation (James 2015). Costanza et al. (2014) however argue that valuation of ecoservices (in whatever units) is not the same as commodification or privatization. They argue (p. 152) that: 'these services must be (and are being) valued, and we need new, common asset institutions to better take these values into account'.

However, TEEB concluded that the mainstream economic beliefs of the values of ecosystems and biodiversity are defined by *people's willingness to pay for them.* In other words, it accepts the Cost Benefit Analysis approach (Davidson 2013). However, the neoclassical approach to valuation (people's willingness to pay) is based on the belief that there is no intrinsic value except as perceived by humans (Crabbe 2008). This approach cannot measure benefits *to* nature by asking people about their willingness to pay for benefits *from* nature to humanity (Davidson 2013). It has been argued that intrinsic value lies outside the scope of the wide palette of

ES, and that: 'Intrinsic value is incompatible with any ecosystem service (Davidson 2013: 172). However, while TEEB acknowledged the danger of monetary valuation, its authors concluded they had to value ES in monetary values to save them. This is a difficult ethical call, as we shall see.

So how to value ES meaningfully? Having warned of the problem of deriving value, TEEB described three ways to articulate value (Brondizio et al. 2010: 163):

1. **Contingent valuation method**—value is deemed to be pre-existing and needs to be 'discovered'. There is a separation between values and facts, and human and nature. It works on the principle that you can substitute money for ecosystem goods and services.
2. **Deliberative or social process methods**—has a democratic stance, and value is 'constructed' in social processes, and unknown values evolve through deliberation.
3. **Multi-criteria methods**—involves complexity, value is understood in terms of ranked importance.

However, clearly none of the above gives nature a *voice*. All of the above are anthropocentric, and none of them accept that nature has intrinsic value. The first believes that money can replace essential ES, which is a delusion in terms of ecological reality (Washington 2013). The second seems to think that value depends just on the group of people who 'construct' it (a strongly postmodernist stance). This may at first glance seem 'democratic' but is only a partial human democracy, with no ecodemocracy in play (see Chap. 11 in this volume by Gray and Curry). The third basically seems to dodge the issue, being made up of many small values that can be easily biased (Pascual et al. 2010). Accordingly, each of the above has problems and is unsatisfactory to value ES, both practically and ethically.

However, I do understand the dilemma faced by the authors of TEEB, wondering what else they could *do* that has not been tried before? Intrinsic, non-material, scientific and spiritual values have been put forward time and again for the protection of nature (e.g. Catton 1982; Ehrlich and Ehrlich 1991; Curry 2011; Wijkman and Rockstrom 2012), and Western society has not listened, or listened and not acted. However, I remain unconvinced TEEB chose the best approach out of this dilemma.

Are 'Natural Capital' and 'Ecosystem Services' Anthropocentric?

First, let us consider 'natural capital'. By using terms such as 'natural resources' and 'natural capital', society is effectively reducing the diversity of life (in all its beauty) down to just a 'resource' (Crist 2012) and a natural form of 'capital' for neoclassical economics to consider (Rolston 2012). Braungart and McDonough (2008: 155) point out that the idea of 'natural capital' might have been valid 200 years ago but: 'now it cries out for rethinking'. It should be emphasized that Costanza and Daly (1992) argued that Total Natural Capital must *remain constant*, and cannot be traded for

human-made capital (the 'weak sustainability' argument, Washington 2015). However, it is clear from Costanza and Daly (1992) that natural capital is something that society can 'bequeath' to future human generations. Dobson (1998) notes that the description of nature as a form of capital: 'is to look at it [nature] in a certain light, as economic asset of some description'. Chesiera and De Groot (2003: 221) argue that such an appraisal of nature as capital: 'simply reiterates the reductionistic and utilitarian vision of neo-classical economics'. This ignores the fact that Daly and Costanza are renowned *ecological* economists, however it is correct to characterize the concept as utilitarian. It also appears to be implicitly anthropocentric. However, Daly (2014a) explains the confusion around the way the term is being used. Neoclassical economics was treating nature as though it was 'income' that can be consumed, rather than 'capital' that should not be consumed. Hence Schumacher (1973) and Daly (2014a) speak of natural capital in terms of 'stocks and flows' of matter and energy in nature, arguing they must *not* be diminished. They were not arguing that it should be given a monetary value and commodified, quite the opposite. Daly (2014a) argues strongly that nature does have intrinsic value. Daly (2014a) agrees with Monbiot (2014) that the monetary commodification of the term 'natural capital' is a bad thing. It was never what he was arguing for, yet this meaning of commodification has now taken over discussion of 'natural capital'.

Monbiot (2014) argues that natural capital (in the commodified sense) is the triumph of neoliberalism, where we don't speak of 'nature' anymore, for:

> It is now called natural capital. Ecological processes are called ecosystem services because, of course, they exist only to serve us. Hills, forests, rivers: these are terribly out-dated terms. They are now called green infrastructure. Biodiversity and habitats? Not at all à la mode my dear. We now call them asset classes in an ecosystems market.

He argues the monetary values derived for natural capital are gobbledegook, as we are dealing with values which are non-commensurable. Sullivan (2017) points out that Credit Suisse, with the backing of the international environmental organizations WWF and the IUCN, produced a series of reports that proposed 'capitalizing conserved natures' in situ. This demonstrates that natural capital *is* being commodified, where investors are involved with a focus of making money—rather than protecting nature for its intrinsic value. It is notable that the 'Natural Capital Project' (https://www.naturalcapitalproject.org/) set up by Stanford University, the Chinese Academy of Sciences, and the University of Minnesota has no discussion of the ethics of the commodification of natural capital. Even more worryingly, the focus on 'critical natural capital' suggests that some natural capital is *not* in fact critical to humanity, and hence is not something to be concerned about.

Moving to ES, Costanza et al. (2014: 153) argue:

> Probably the most important contribution of the widespread recognition of ecosystem services is that it reframes the relationship between humans and the rest of nature.

However, one must question if this is true? Do ES actually reframe the relationship between humans and nature? 'Ecocentrism' as a *worldview* certainly does this (Washington et al. 2017) but do ES? Costanza et al. (2017: 3) argue that ES are not

anthropocentric: 'rather than implying that humans are the only thing that matters, the concept of ecosystem services makes it clear that the whole system matters'. Why this is the case however is not clearly explained.

We need to return to the big picture, and consider how ES relates to conservation and ecojustice. ES as defined are anthropocentric in that they are all about the services provided 'to humanity' by nature. The term could have been defined differently, being the *services ecosystems provide their species* (not just humans). Clearly, all species on Earth require the services that their ecosystems provide. However, that was not the definition used, and we seem stuck with this anthropocentric definition. TEEB argued that the basic assumption is that society can assign values to ES and biodiversity, but only to the extent that these fulfil needs of conferring satisfaction to humans, either directly or indirectly (Pascual et al. 2010). The economic conception of 'value' they admitted was thus anthropocentric. Others recognise the limitations of ES, and Pascual et al. (2017) suggest that it be replaced by the term 'Nature's Contributions to People' (NCP). They state it (p. 15): '…goes further by explicitly embracing concepts associated with other worldviews on human–nature relations and knowledge systems (e.g. 'nature's gifts' in many indigenous cultures)'. While the broadening of the term to consider other worldviews is of value, this is still anthropocentric as it remains contributions *to people*. As such it has missed the point that all species require contributions (gifts) from their ecosystems. A recent article on NCP (Diaz et al. 2018) fails to discuss their anthropocentric origin or to even mention the word 'ethics'. Perhaps it is time to ethically consider an alternative term—'People's Contributions to Nature' (PCN)?

Batavia and Nelson (2017) argue that ES clearly *are* anthropocentric and utilitarian. It has also been argued that the ES concept is not meant to replace biocentric arguments, but bundles a broad variety of anthropocentric arguments for protection and sustainable human use of ecosystems (Chan et al. 2012; Luck et al. 2012). These authors hence accept that ES *are* anthropocentric, and that biocentric arguments are also needed (ibid). Pascual et al. (2010) agree that ES valuation should be used to complement, but not substitute for, other legitimate ethical or scientific reasoning (and arguments) relating to biodiversity conservation. Davidson (2013: 175) takes a slightly differing stance, arguing:

> That ecosystem services do not cover intrinsic value does not necessarily make ecosystem services an anthropocentric concept in the moral sense, however. The concept of ecosystem services only becomes anthropocentric in the moral sense if accompanied by the denial that nature or benefits to nature have intrinsic value.

In fact Davidson argues for a 'Total Economic Value' (TEV) that has 'benefits to humans' as one main category and 'benefits to nature (intrinsic value)' as the other main category. However, he admits that how you measure the latter is as yet 'unknown territory' (ibid). However, academia overwhelmingly does ignore 'benefits to nature', and similarly denies that nature has intrinsic value. This lack of academic focus on ecocentrism and ecological ethics (Curry 2011) makes clear that ES, as currently applied by academia, *is* decidedly anthropocentric.

As noted in the valuation section, TEEB decided that society operates according to neoclassical economics, including neoliberal markets, hence they concluded (with a degree of evident desperation) that they simply *had* to adopt a monetary approach. However, the growth economy espoused by neoclassical economics is fundamentally unsustainable, and arguably the key cause of ecocide (Rees 2008; Daly 1991, 2014b; Dietz and O'Neill 2013). Costanza et al. (2017: 1) argue: 'the substantial contributions of ecosystem services to the sustainable wellbeing of humans and the rest of nature should be at the core of the fundamental change needed in economic theory and practice if we are to achieve a societal transformation to a sustainable and desirable future'. However, clearly ES cannot properly foreground the sustainable well-being of the 'rest of nature', when all ES benefits are *for humanity*.

Turnhout et al. (2013), Monbiot (2014) and Sullivan (2017) see valuation and shadow-pricing as leading to commodification. Costanza et al. (2017) argue that valuation of nature using ES is not commodification, but is this correct? Once monetary values are allocated, then neoclassical economics will insist that 'the market' decide whether we conserve an area of nature—or not. Ethically, the commodification of nature has never been a good idea, as it plays into the idea that nature is just a pool of resources for human mastery (Curry 2011; Crist 2012; Monbiot 2014; Kopnina 2017), and ignores the intrinsic value of nature. Daly and Cobb (1994: 379) concluded that a: 'sustained willingness to change depends on a love of the earth that humans once felt strongly but that has been thinned and demeaned as the land was commodified'. Similarly, the psychological and spiritual values of nature cannot be meaningfully commodified. The sacred has no cost we can establish, it is *sacred*. No monetary value given to a wild river (as discussed in Chap. 8 by Strang in this volume) or a sacred mountain can ever be considered 'ethical' in terms of ecological ethics (Curry 2011). Monetary values in a Cost-Benefit Analysis are designed to be compared against each other to determine what we protect, and what we develop. By commodifying nature, we are thus playing the game of anthropocentrism and neoliberalism (Monbiot 2014)—two ethically flawed worldviews that ignore ecological reality (Washington 2015). By doing so I believe we are thus failing ethically and philosophically to support a viable transition to a truly sustainable future. Or as Monbiot (2014) argues, by assigning monetary values to natural capital we are effectively pushing the natural world even further into the neoliberal market system that is 'eating it alive'.

However, Pascual et al. (2017) suggest that the 'pluralistic valuation' in Fig. 6.2 may move society away from the neoclassical Cost-Benefit Analysis. This could be a constructive way forward. It is difficult however to see the dominant neoclassical economics supporting such a pluralistic valuation, hence the need for society to swiftly change to ecological economics (Daly 2014b).

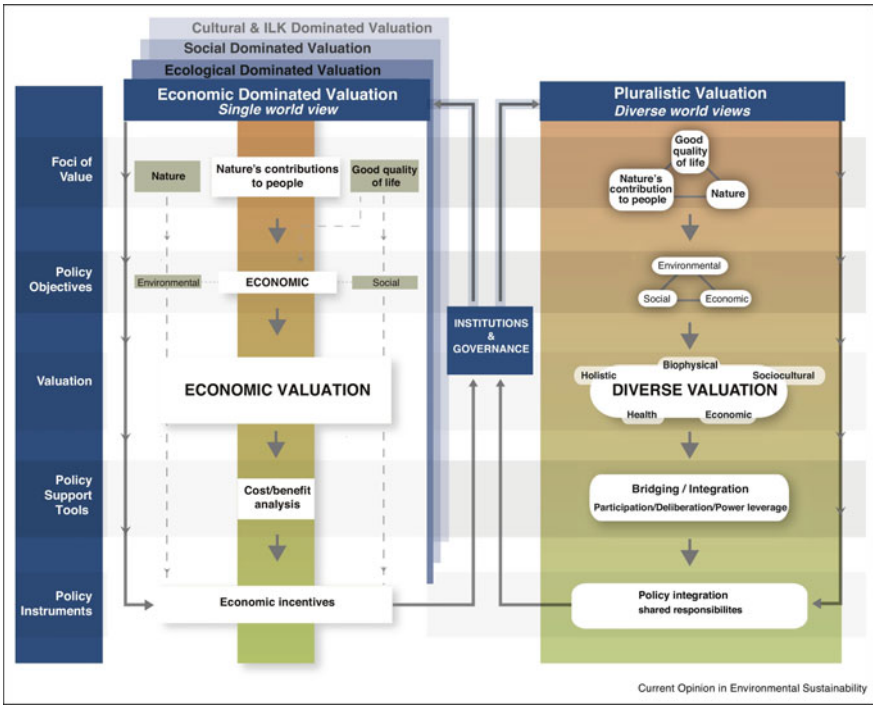

Fig. 6.2 Economic valuation versus pluralistic valuation (*Source* Pascual et al. 2017)

Have ES Worked for Conservation?

In practical terms, we should ask: 'Have 13 years of ES worked for conservation?'. This remains a difficult question to arbitrate. Has it made a difference practically in terms of protecting nature? Native habitat continues to be cleared and fragmented, climate change degrades ecosystems, native species are still overharvested, and species pushed towards extinction as the 6th mass extinction accelerates (Ceballos et al. 2015). Jordan (2018) argues that the natural capital approach has increased tree and plant cover so that China now has the highest rate of reafforestation in the world. Ehrlich (2018) argues: "In my view both natural capital and ecosystem services have made major contributions to the (basically losing) fight for conservation. We'd be in much worse shape without them". However, he also argues that "ethical arguments go nowhere". In contrast, I believe ethical arguments based on intrinsic value are both the best chance we have for long-term conservation, but also for a meaningful sustainability (Washington 2015). It has also been argued that planning and executing conservation strategies that are based on ES provision might not safeguard biodiversity, but only divert away attention and interest from more fundamental problems (Vira and Adams 2009). Kopnina (2017) warns that the prevailing assumption of human entitlement to the benefits of nature will facilitate the conversion of the last

remaining wilderness into 'resources'. Batavia and Nelson (2017) argue the idea of nonhuman *intrinsic value* is certainly at risk, and will likely become functionally extinct, if the ES approach continues to subsume conservation practice and policy. This is especially worrying, as the intrinsic value of nature is a fundamental part of ecocentrism, and arguably the ethical basis for most past conservation strategies. ES are also being used to justify anthropocentric conservation strategies such as 'new conservation' (Batavia and Nelson 2017).

The use of 'Payment for Ecosystem Services' (PES) has arguably had a positive effect in some countries, such as increasing rainforest area in Costa Rica (Barton 2013). Others however argue that PES has yet to demonstrate efficacy and financial sustainability (Hiedanpaa and Bromley 2014). Indeed, even staunch advocates of ES such as Costanza et al. (2017: 13) note that: 'practical applications are still limited'. Given my original hope raised in the Introduction regarding ES, one key question to ask is: 'Has it taught society that we are fully dependent on nature?'. This clearly was the original hope of Schumacher (1973) and Costanza and Daly (1992) when speaking of 'natural capital', and of Ehrlich and Ehrlich (1981) when they originally formalised the term 'ecosystem services'. However, the answer is clearly 'no', terms such as natural capital and ES have *not* embedded in society the reality of human dependence on nature. Indeed the idea of human mastery of nature via techno-centrism is worse than ever in Western society (Bonnett 2007; Curry 2011; Washington 2013; Vetlesen 2015) and natural capital and ES are arguably being used as the Trojan Horse to ideologically embed neoliberalism in conservation (Monbiot 2014).

Conclusion

The last 20 years have seen enormous discussion of natural capital and ES, yet despite this the environmental crisis has worsened, as have prospects for the long-term conservation of nature. It may be that through ES, some decision-makers are now more aware that society is completely dependent on nature, and thus some decisions may have been better than they might otherwise have been. We should ask how ES (and natural capital in its commodified sense) relate to ecojustice? One can only conclude: 'not well'. All the stakeholders for natural capital and ES are *human* stakeholders, and the benefits come only to humans. Do ES relate any better to social justice? At first glance their focus on benefits to humans (and the accompanying argument that we need nature to provide ES) may suggest this. However, the fact that ES ignore 'benefits to nature' means that over time biodiversity will continue to decline, with consequent impacts on society, especially the poor. The benefit of ES to social justice are thus questionable. Similarly, ES do not help reconcile the two justices (social and ecological)—as both 'natural capital' and ES were born out of an anthropocentric worldview. Perhaps it is time to consider that if the worldview and ethics that defined ES were flawed, the term itself may be also? If the anthropocentric and utilitarian ethics of neoclassical economics are flawed, then maybe the idea of

assigning 'shadow prices' is indeed part of *commodifying nature*, and hence it too is flawed? Of course ES (or NCP) are not going to go away, however perhaps we should acknowledge their origins and inherent bias? Its value to conservation remains to be seen, but may improve if the suggested strategy of 'pluralistic valuation' (Fig. 6.2) became mandatory.

The point of this chapter was to consider whether ES will help conservation in the future, as well as whether they would help to reconcile social justice and ecojustice? Given the anthropocentric underpinnings of ES and natural capital, this seems unlikely. It is increasingly likely that many anthropocentric scientists will agree to research what biodiversity is needed to retain ES *for people*. Thus they would seek primarily to protect only 'critical natural capital', with the implication that society can dispense with that natural capital that is *not* critical to human survival. Because of the flaw in its definition, some anthropocentric ES practitioners may indeed be happy to let the rest of nature (not necessary for human survival)—slip away. Such an approach however is not conservation, but acquiescence to further ecocide and extinction. 'Ecosystem services' thus remain a conflicted term, and certainly cannot be considered one that foregrounds ecocentrism and ecojustice. It may well be one more 'Trojan Horse' of anthropocentrism within the conservation community (similar to 'new conservation' and 'critical social science'). ES on balance may thus be negative, as they assist in denying the need for ecological ethics, and assist in burying the key ethical premise that nature should—first and foremost—be conserved for its intrinsic value.

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