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Article

Assessing the Relationship Between Human Well-being and Ecosystem Services: A Review of Frameworks

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Abstract

Focusing on the most impoverished populations, we critically review and synthesise key themes from dominant frameworks for assessing the relationship between well-being and ecosystem services in developing countries. This requires a differentiated approach to conceptualising well-being that appropriately reflects the perspectives of the poorest–those most directly dependent on ecosystem services, and their vulnerability to external and policy-driven environmental change. The frameworks analysed draw upon environmental sciences, economics, psychology, sociology, and anthropology, and were selected on the basis of their demonstrated or potential ability to illustrate the relationship between environmental change and human well-being, as well as their prevalence in real world applications. Thus, the synthesis offered here is informed by the various theoretical, methodological, and hermeneutical contributions from each field to the notion of well-being. The review highlights several key dimensions that should be considered by those interested in understanding and assessing the impact of environmental change on the well-being of the world's poorest people: the importance of interdisciplinary consideration of well-being, the need for frameworks that integrate subjective and objective aspects of well-being, and the central importance of context and relational aspects of well-being. The review is of particular interest to those engaged in the post-2015 development agenda.

Keywords: happiness, well-being, environmental change, economics, development, anthropology, conservation, sustainable development goals

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INTRODUCTION

Myriad policies have been developed and implemented in an attempt to minimise the impact of biodiversity loss, habitat degradation and land-use change on people and the environment (Angelsen 2008; Engel et al. 2008; Heller and Zavaleta 2009; Stern 2009; TEEB 2010; GEF 2012). This review joins a growing literature that focuses on human well-being as a central concern of such policy interventions

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(Dasgupta 2001; Layard 2005; Dolan 2006; Stiglitz et al. 2009; Cardinale et al. 2012; Fox 2012). Our specific focus is on understanding how natural and policy-driven environmental changes affect the well-being of the world's poorest people. To this end we undertake an interdisciplinary review of several well-being frameworks to identify what insights they can offer regarding the relationship between environmental interventions and human well-being. Such information may be useful for designing and monitoring the impacts of conservation projects in areas where the well-being of the poor depends directly on the environment.

Well-being, as a concept and as a measure of the evolution of the human condition, has emerged largely in response to the inadequacy of earlier uni-dimensional (often financial) examinations of poverty and deprivation. Its emergence is rooted in the Human Development Index (HDI), which by incorporating measures of health, education, and material living standards represents an important first step towards establishing a more holistic evaluation of the human condition (UNDP 1990). Combining social, economic, environmental, and institutional components of poverty reduction programmes, the sustainable livelihoods approach (SLA) developed by Chambers and Conway (1992) provided an actionable framework for designing and implementing interventions. The UK Department for International Development (DFID) recognised the value of the SLA for international institutions, and it was adopted at a high level across a wide range of contexts (Scoones 1998; Hussein 2002). The Millennium Development Goals (MDGs) take this further by explicitly recognising not just poverty and hunger, but also education, gender equality, health, and environmental sustainability as core components of development (UN 2002).

Each of these approaches has extended the boundaries of poverty research to include broader conceptions of the ultimate goal of development. As poverty and development literatures have expanded in scope to include entitlements (Sen 1981), health (UN 2002), the natural environment (Dasgupta 2001, 2003; Adams et al. 2004), social relations and vulnerability (Hussein 2002; Adger and Winkels 2014), the notion of well-being has emerged as a powerful unifying concept that extends well beyond traditional economics (Stiglitz et al. 2009). This broader scope has facilitated an understanding of what is now known as multidimensional, rather than simply income or consumption, poverty. Though income contributes to well-being, so too do many other factors, and a growing evidence base demonstrates that there is not a straightforward correlation between well-being and poverty (Graham 2009). Well-being is thus conceptualised as the flip side of multidimensional, rather than income or consumption, poverty. As multidimensional poverty declines, well-being increases (Alkire and Foster 2011; Fisher et al. 2013). Indeed, the pursuit of well-being has become a direct national policy objective in the UK, Italy, Germany, Bhutan, Brazil, Ecuador, Bolivia, and China (NEF 2012) and will potentially be a core component of the sustainable development goals (SDGs; Griggs et al. 2013; Costanza et al. 2014). Conservationists should incorporate these social science advances by considering the impact of interventions on well-being, rather than income alone, to ensure interventions are aligned with national objectives.

While a universally applicable definition of well-being that transcends disciplines, cultures, and scales of analysis remains elusive, several frameworks for understanding what is, or could be meant by 'well-being', have emerged over recent years. Many of these arose out of specific disciplines, largely within the social sciences, and with varying degrees of interdisciplinary and intersectoral collaboration. Others emerge in the agendas of national and international research and practitioner agencies, each operationalising it in their own way (for example CIFOR's nested spheres of poverty, Gönner et al. 2007). Gough et al. (2007) note that despite their distinct origins and approaches, there appear to be some important points of convergence among these frameworks.

This review is motivated by five current and interrelated trends. First is the growing acceptance by governments and societies that a narrow focus on GDP is insufficient, that better outcomes may result from attempts to maximise 'happiness' or 'well-being' rather than financial wealth, and that the natural environment is fundamental to this pursuit (Dolan 2006; Stiglitz et al. 2009; NEF 2012). A second motivating factor is the increased focus on incentive-based conservation interventions such as payments for ecosystem services (PES; Jack et al. 2008; Gómez-Baggethun et al. 2010; Farley and Costanza 2010). While such interventions aim to promote economic efficiency, little is known about how they affect well-being, particularly for vulnerable human populations (Milder et al. 2010; Schreckenberg et al. 2010; Corbera 2012; Clements and Milner-Gulland 2014). This creates uncertainty over the likely outcomes of environmental and conservation initiatives, which could lead to unintended negative consequences for poor people affected by PES programmes. This in turn highlights a third factor: the growing recognition that relationships between ecosystem services and human well-being are unclear and indirect, and that in order to comprehend them we must first understand what well-being is (Adams et al. 2004; Jordan et al. 2010; Daw et al. 2011). Furthermore, a core motivation for this review is the emergence of parallel literatures on these issues within disciplines. This creates both an opportunity and a need for interdisciplinary learning and collaboration, particularly between researchers in conservation, the natural, and social sciences (West et al. 2006; Milner-Gulland 2012). Finally, the structure and design of the post-2015 development agenda, including the highly anticipated 'Sustainable Development Goals' (SDGs), has much to gain from an understanding of the relationships and frameworks reviewed here. The joint emphasis on human development, poverty eradication, and environmental sustainability makes well-being an important potential measure of success and final objective of the SDGs (Griggs et al. 2013; UN 2013).

This review is targeted towards those researching and implementing environmental interventions (and specifically, conservation and ecosystem service interventions), as well as those interested in understanding determinants of the

well-being of the world's poor, particularly as it relates to the natural environment. This includes conservationists, policy makers, development agencies, natural resource managers, non-governmental organisations (NGOs), and academics. We focus both on the well-being impacts of environmental change and of changes in access to the natural environment. As such, the interventions we consider include those directly driven by policy, such as the introduction of protected areas or PES schemes. However, our discussion also applies to the impacts of broader trends such as globalisation and climate change. The review is therefore of particular interest to those engaged in drafting the sustainable development goals and the post-2015 development agenda.

After examining the definitions and assumptions present in the literature, we offer an in-depth review of some of the main well-being frameworks. We go on to synthesise the results of our work into a discussion of key constituents of well-being. This provides a basis for thinking about the well-being of the rural poor, how it may be affected by changes in access to or the provision of ecosystem services, and identifies key elements to include when assessing well-being. We focus particularly on security and the importance of assessing well-being change on appropriate scales. The paper concludes by discussing the importance of flexible, interdisciplinary frameworks that can integrate both objective and subjective conceptualisations of well-being, and of social context and relational meanings of well-being, when seeking to evaluate the effects of environmental change and conservation initiatives.

The frameworks reviewed here were selected against three criteria, and although broadly representative of the field, ours is not an exhaustive list. The criteria for inclusion were the framework's prevalence and influential nature in the field, its potential for informing research in interactions between environment and well-being for the world's poorest people, and its usefulness in illustrating the range of disciplinary and conceptual approaches that exist. Adhering to these criteria, we selected four frameworks for in-depth review. Some frameworks were excluded because they have not been widely adopted, are similar to and add little beyond those already reviewed, or because they fail to adequately assess the differentiated experiences of well-being encountered by the world's poorest. Where appropriate, we include alternative frameworks as illustrative examples.

WELL-BEING AND THE ENVIRONMENT: DEFINITIONS, ASSUMPTIONS, AND FRAMEWORKS

Various individuals, institutions, research projects, and disciplines have developed distinct definitions of well-being to serve a range of contexts and purposes (Sen 1985; Ryan and Deci 2001; Dasgupta 2001; Millennium Ecosystem Assessment 2005; Gough and McGregor 2007; CIFOR 2007; NEF 2009; MacKerron 2011). Among these there exist both considerable overlap and unique perspectives, and although it is not instructive to list each definition here, one purpose of this review is to highlight key points of convergence and contrast. A reasonable starting point is Dolan et al.'s (2006) identification of five standard approaches to defining well-being. These loosely reflect parallel disciplinary accounts and are succinctly summarised by MacKerron (2011):

- *Preference satisfaction*: well-being determined by ability to meet personal wants;
- *Objective lists*: well-being entails fulfilling externally defined material, social, and psychological needs;
- *Eudaimonic/flourishing*: well-being entails meeting one's full potential in various domains of life (see Ryan and Deci 2001);
- *Hedonic*: well-being defined in terms of dominant moods and feelings (see Ryan and Deci 2001);
- *Evaluative*: in which individuals report self-evaluations of their own well-being.

These approaches differ in terms of their initial assumptions regarding the degree of objectivity and subjectivity, the relevance of etic (externally assessed) versus emic (from within the culture) accounts, emphasis on individualism versus relatedness, and the use of quantitative versus qualitative information for analysis. Despite these differences, they share at least one common element: well-being is directly affected by changes in environmental quality and access. Because each of these perspectives offers valuable insight into understanding and using well-being, no single approach is sufficient in isolation. As a result, various broader conceptual frameworks have emerged in attempts to combine several of these core components (Table 1).

Although there is some overlap, core differences may be the result of disciplinary traditions, as explored by Bevan (2007), or derive from the different stakeholder perspectives of those using well-being as a measure of change. Moreover, various stakeholders' perspectives (including community leaders, 'grass-roots' NGOs, national governments, global NGOs, the private sector, and academia) may influence the definition and assessment of well-being. That the definition of well-being can be driven, at least in part, by the perspectives of those who wish to use it as a measure of progress deserves further attention. One particularly neglected aspect of this is the fact that concepts of well-being tend to be externally developed, and therefore etic in quality; emic accounts of relationships between well-being and ecosystem services are much less prevalent in the literature (Schmidt and Bullinger 2007).

Several strategies have been identified for developing cross-cultural studies of quality of life and human well-being (WHOQOL 1998; NEF 2012). This approach aims to develop a universal measure, identically applied to all cultures. Schmidt and Bullinger (2007) argue that while such an approach may well succeed in simplifying comparisons, what it loses in flexibility, cultural sensitivity, and contextual relevance renders it of little use for examining many of the core components and differentiated experiences which comprise well-being. An alternative approach is to develop a unique measure specifically

Table 1

Comparison of well-being frameworks

	Happy Planet Index	Domains of life	Sustainable livelihoods approach	Well-being in developing countries
Disciplinary roots	Happiness economics Ecological footprinting	Social psychology (see Campbell 1976)	Development studies	Interdisciplinary, but mainly social sciences
Scale of application	National Global	Individual	Individual Community National International	Individuals and local communities, but positioned within national and global
Required data	Experienced well-being Life expectancy Ecological Footprinting	Objective and subjective measures of domain satisfaction	Natural, physical, financial, human, and social resources	Differs by case study
Etic components	Life expectancy Ecological footprinting	Researcher selects domains and indicators	Selection of capital and resources for inclusion	Objective data (e.g., income and health)
Emic components	Self-reported experienced well-being	Some indicators may be emic in nature.	Qualitative perceptions of social relations	Subjective self-evaluations of objective circumstance
Strengths	Minimal data requirements Well suited to global comparison	Combines objective and subjective data Highlights various components of well-being	Flexible framework Highlights social and cultural elements Clear role for natural environment	Relatively comprehensive Flexible framework Data qualitative and quantitative, and objective and subjective
Limitations	Capturing *differentiated* experiences Ecological Footprinting may not adequately reflect environmental concerns	Lack of anthropological underpinnings, particularly in understanding emic components	Incorporating both micro- and macro-level trends	Somewhat limited role of natural sciences
Main sources	New Economics Foundation	Cummins (1996) Schmidt and Bullinger (2007)	Chambers and Conway (1992) Scoones (1998)	Gough and McGregor (2007)

tailored to each community of interest. However, the latter fails where the former succeeds: such assessments may not be comparable, severely limiting their use for cross-cultural and national scale research. Thus, Schmidt and Bullinger's (2007) final strategy entails researchers developing a universally applicable framework with the flexibility to include contextually specific components. The framework provides an analysis that is comparable across sites and cultures, while specific components that more meaningfully capture local nuances can be included. The frameworks reviewed below take this approach, albeit in varying degrees.

Happiness economics and the Happy Planet Index

As a field, economics is most commonly associated with the neoclassicalists' preference satisfaction approach to defining well-being (Dolan et al. 2006). This account emphasises the individual, whose wants are infinite and who maximises utility (considered synonymous with well-being) by allocating resources (e.g., income or time) optimally across the range of available consumption goods. A key and highly controversial implication of this approach is that well-being necessarily increases with income. In a seminal piece largely considered a cornerstone of happiness economics, Easterlin (1974) challenged this approach, posing the seemingly innocuous question, "does economic growth improve the human lot?" Using survey data on subjective self-reported evaluations of happiness, he found that 1) within countries, the wealthy tended to be happier than the poor, however 2) increases in income were not proportional to increases in happiness, and 3) this initial study offered no evidence that people in wealthy countries were happier than those in poor countries. Blanchflower et al. (1993) found similar results in the USA; income gains have negligible (although very slightly positive) effects on happiness, but noted that changes in subjective well-being are differentiated across gender and age (Blanchflower and Oswald 1996). A persistent result from this body of research is now known as the Easterlin Paradox (EP): "at a point in time both among and within nations, happiness varies directly with income, but over time, happiness does not increase when a country's income increases" (Easterlin et al. 2010: 22463).

One potential explanation for the Paradox is that beyond a basic consumption threshold, further gains in well-being may be associated with relative rather than absolute income gains (Easterlin 1974; Easterlin 1995; Layard 2005; Easterlin et al. 2010). Oswald (1997) argues that money is a means to an end and cannot directly 'buy happiness,' a conclusion that for most is unsurprising. Even neoclassical economists tend to accept this, with the caveat that income may well be highly correlated with other components of human well-being. Pragmatic concerns for data reliability, availability, and comparability have been used to justify

the income-oriented, preference satisfaction conception of well-being (Boarini and d'Ercole 2006). Happiness economics and the EP, however, suggest that the correlation between income and well-being is too weak to rely on the preference satisfaction approach. Clark et al. (2008) suggest instead that the role of income can be deconstructed into consumption and relational duties. The former deals with individual consumption, and the latter with one's position relative to other people.

This is an important departure. The insufficiency of income as an indicator of well-being has led to an expansion of utility functions to include non-traditional subjective parameters (Di Tella and MacCulloch 2006, 2008). Thus, 'meeting wants' (i.e., *preference satisfaction*) is now combined with subjective, self-reported happiness (*evaluative*), and socioeconomic status (*flourishing/eudemonic*), to deliver a conceptualisation of well-being within economics that bridges several of the approaches identified by Dolan et al. (2006). The neoclassicalists' concerns over data reliability remain valid, and economists may well face a trade-off between data quality and a more holistic measure of well-being. Two further challenges faced by happiness economists include the treatment of time (embodied in the EP) and the selection of reference groups for comparisons: should groups and individuals be compared to themselves at previous points in time or to each other at the same point in time?

A recent example of an attempt to operationalise an economic notion of well-being on an international scale (while including an explicit role for the natural environment) is provided by the New Economics Foundation (NEF). The NEF defines societal success as high levels of well-being sustained over time, and measures progress in terms of goals (high universal well-being), resources (used sustainably), and human systems (stable economy and peaceful flourishing society) (NEF 2011). The NEF's flagship measure of well-being, the Happy Planet Index (HPI) attempts to offer an efficiency measure of sustainable well-being per unit of resource consumption. The simple formula is given by:

$$\text{Happy Planet Index} = \frac{\text{Experienced wellbeing} \times \text{Life expectancy}}{\text{Ecological Footprint}}$$

Where the numerator is a measure of Happy Life Years, which entails subjective self-reported experienced well-being (EWB) and objective life expectancy (NEF 2012). EWB is taken from the Gallup World Poll's 'Ladder of Life' in which individuals are asked where they stand on a scale from 0 (the worst possible life) to 10 (the best possible life) (NEF 2012). The denominator is the well-known Ecological Footprint (EF; Wackernagel and Rees 1998), and offers a measure of environmental impact.

The HPI offers a clearly defined measure, an interpretable single number, and a means of weighing changes in living standards against their environmental costs or benefits. It can be adjusted for inequality and has already been calculated in 151 countries (NEF: various years). It asserts the agency of the individual in determining experienced well-being, while still including objective data, and implicitly combines each of the five accounts outlined by Dolan et al. (2006) through self-reported EWB.

There are, however, several shortcomings, particularly when considered in the context of this review. First, it is not entirely clear that EWB and EF are comparable across countries, cultures, and time. Both are single numbers attempting to proxy complex phenomena: the resulting HPI statistic may therefore have only local validity, reflecting something quite different from the original intention. Second, conducting surveys on poor rural populations that are often targeted by conservation and ecosystem service interventions is a highly nuanced and challenging process. Such interventions often focus on remote and relatively inaccessible areas where populations may not speak any of the national languages in which surveys are conducted, may live outside the purview of national data collection exercises (often due to financial and capacity constraints or a lack of fixed address), and may hold cultural and social views that map poorly onto national and international concepts of well-being. Thus, although the HPI marks an important step both in measuring well-being and relating it to the natural environment at a broad scale, it lacks the nuance necessary for capturing differentiated experiences amongst our target populations.

Domains of life approach

The initial assumptions underpinning any conceptualisation of well-being can have a significant influence on both the type of insights it can reveal and its scope for operationalisation (Dolan et al. 2006). For example, Rojas (2007) details how two approaches; subjective well-being (SWB) and domains of life, elucidate different elements of well-being due to their different assumptions. SWB affirms the centrality of the individual, the notion being that individuals rather than researchers are the best judges of their own well-being. Allowing people to vocalise their own feelings, it is argued, reduces the disciplinary and cultural biases of the researcher (Rojas 2007).

Alternatively, the 'domains of life approach' assumes that well-being can be understood as the culmination of satisfaction in certain areas of life. The researcher determines the number and composition of domains such as income and employment, family relations, social status, health and nutrition, or security. Although this approach potentially exposes the analysis to the researchers' biases and prejudices (principally through the selection of domains), it may also shed light on which domains offer the highest returns in terms of increasing well-being. That is, it may help identify the weakest thread in the tapestry of human well-being, and thus indicate to which domains attention should be focused (Rojas 2007). Moreover, those measuring the impact of conservation interventions and environmental change can draw specific attention to changing relationships between people and environment.

This has important implications for those interested in understanding *differentiated* experiences of well-being, and may be particularly relevant to policy makers and those wishing to understand the impact of conservation interventions. The

relative contributions of each domain to overall well-being may vary across individuals and demographic groups. In particular, age (Blanchflower and Oswald 2008), gender, ethnicity (Sokoya et al. 2005), and occupation can affect perceptions of the relative importance of each domain. Furthermore, trade-offs and substitution between domains may be possible. For example, decreased satisfaction in the income domain may potentially be compensated by increased satisfaction in social and family relations. Finally, the well-being impact of changes in the environmental domain depends on underlying human-environment interactions. For instance, the impact of changes in wildlife populations or access to hunting grounds differs between those who hunt for sport and those who hunt for food and income. Similarly, changing the access to mountains (for e.g.), may have competing effects on the well-being of those who consider such environments sacred and those who want access for recreation.

One of the most influential examples of the domains of life approach in practice is the World Health Organization's Quality of Life (WHOQOL) instrument. WHOQOL defines well-being as "an individual's perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns", and gathers information on six domains of life: physical, psychological, social, environmental, economic, and spiritual (WHOQOL 1998: 3). Developed in 15 distinct cultural settings and tested in 37 field centres, WHOQOL attempts a cross-cultural assessment of health-related quality of life (HRQOL) based on the recognition that 'objective' measures of health established in developed countries may reflect the social and cultural values of doctors and policy makers, which are frequently not shared by other cultures (WHOQOL 1998). Schmidt and Bullinger (2007) caution that complex anthropological processes underlie cross-cultural (and indeed, international) assessments of health-related quality of life. Not all ailments are perceived equally across cultures. This is particularly the case for mental health afflictions, ailments of old age, and common illnesses that are pervasive in certain communities. Thus, HRQOL must balance objective medical criteria and subjective evaluations of health, yet historically there has been a lack of anthropological expertise and influence in the development of these measures (Schmidt and Bullinger 2007).

Sustainable livelihoods approaches

Adopted by the UK Department for International Development (DFID) in the late 1990s, SLA gained broad institutional backing from major international organisations (UNEP, FAO, IFAD, WFP), development agencies (DFID, Sida), NGOs (Oxfam), and research centres (IISD, IDS, ODI, Hussein 2002; Brocklesby and Fisher 2003; Schreckenberg et al. 2010). Within the context of existing formal and informal institutions, the core SLA framework combines livelihood resources with livelihood strategies in an asset vulnerability approach to poverty reduction (Scoones 1998; Brocklesby and Fisher 2003). The SLA necessitates that qualitative perceptions of relationships and position within social structures are recognised as core elements of the broader poverty reduction process. The broadly accepted core definition underpinning SLA was set out by Chambers and Conway (1992: 26).

> A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base.

Livelihood resources are understood to include tangible assets such as *natural* (timber and non-timber forest resources, water, wildlife), *physical* (shelter, infrastructure, equipment), and *financial* capital, as well as intangible *human* (education, skills, health) and *social* (institutions, relationships, trust) resources (see Brocklesby and Fisher 2003; Schreckenberg et al. 2010). Later work built upon this to incorporate gender, power, markets, rights, and legal frameworks (Hussein 2002). Livelihood strategies include agricultural intensification and expansion, livelihood diversification, and migration (Scoones 1998). Institutions and vulnerability are explicitly recognised as integral components of the SLA, and provide the crucial context in which resources and strategies can be deployed and implemented. Finally, the SLA definition of sustainability differs from that used in the sustainable development literature. The Chambers and Conway (1992) definition above is closer to the ecological notion of system resilience to shocks such as natural or policy-driven environmental change (Allison and Horemans 2006).

The SLA benefits from a clear and broadly accepted underlying definition of what a sustainable livelihood entails, and the core set of assets and strategies has been consistently adopted by agencies and researchers using this approach in a broad range of contexts (Brocklesby and Fisher 2003). However, the SLA was initially developed for application at individual and household levels; use by governments and international organisations introduced challenges in terms of how assets, institutions, and vulnerabilities were defined and interpreted at different levels of analysis (Schreckenberg et al. 2010).

Several qualities of the SLA make it an important framework for review, despite its less direct relationship to the concept of well-being as compared to other frameworks: its emphasis on local context, vulnerability, and institutions; a focus on individuals situated within the context of social relations; a clear and direct role for the natural environment; flexibility to capture differentiated experience; focus on the effects of exogenous shocks (Scoones 1998; Allison and Horemans 2006). Scoones (2009) argues that the emphasis on context and local perspective introduces a much needed transdisciplinary approach to understanding ways of life for the world's poorest populations. In practice, however, applications of the SLA have encountered several persistent challenges. The first entails difficulty engaging with globalisation and reconciling micro-level experiences with macro-level economic and

political trends. Large donor agencies and governments required greater comparability and simpler progress reporting at national and international levels (Scoones 2009). This leads directly to the second criticism of the SLA, which is that it failed to account adequately for power and politics, to which poor populations are particularly vulnerable. Perhaps the greatest challenge in implementing the SLA is the issue of scale, and relating local voices to national trends (Schreckenberg et al. 2010). Finally, the SLA gained momentum in the social sciences and with some policy makers, but lacked an equal engagement with natural scientists involved in developing environmental interventions.

Allison and Ellis (2001) adopted the SLA to examine small-scale fisheries management. Their analysis demonstrated differentiated responses to natural and policy-driven interventions among individuals, households, and communities. For example, in response to two shocks, a lower natural stock or a new catch quota, individuals may diversify by targeting different species, 'fishing down the food chain' (World Bank 2009), or by working in agriculture. Households and individuals may pursue alternative livelihood strategies by reallocating labour, changing consumption behaviour, or migrating. Finally, neighbouring communities may develop reciprocal access agreements to take mutual advantage of natural stock variation (Allison and Ellis 2001). The SL framework also highlights the disconnect between local perspectives and global trends. Local programmes to increase the SL asset base, including subsidies for physical capital (boats, fuel, equipment) and institutional improvement (trading organisations that stabilise prices) may be at odds with national and international trends such as market liberalisation (Allison and Horemans 2006).

Well-being in developing countries framework

The Well-being in Developing Countries Research Group (WeD) at the University of Bath was established "*to develop a conceptual and methodological framework for understanding the social and cultural construction of wellbeing in developing countries*" (Gough et al. 2007: xxii). Moving beyond income poverty, WeD undertook a simultaneous exploration of human development, resources and agency, etic (objective) *and* emic (subjective) approaches, individual *and* shared well-being, quality of life studies, theoretical *and* applied research, and qualitative *and* quantitative methods. The italics are deliberate. Here, well-being entails a complex assembly of factors, and while their relative weights may vary across time, place, and culture, none can be excluded entirely.

At its most basic level, WeD conceives of well-being "as arising from the combination of:

- The resources a person is able to command;
- What they are able to achieve with those resources, and in particular what needs and goals they are able to meet; and
- The meaning that they give to the goals they achieve and the processes in which they engage." (McGregor 2007: 317).

Well-being in this context entails not only objective circumstances, but also the individual's subjective interpretation of them, both of which are considered within the context of society and culture. Furthermore, because socio-cultural contexts evolve continuously, so too must our conception of well-being. Material gains and losses can precipitate fundamental reconstructions of identity, both for individuals and societies (McGregor 2007).

WeD draws heavily on the 'theory of human need' (THN; Doyal and Gough 1991). The theory distinguishes between universal needs and local wants, both of which can be met in various, often culturally and socially defined ways. Needs include, for example, physical health and autonomy (defined as control over one's life and actions) and harm is experienced when they are not satisfied. THN also introduces the notion of critical autonomy–the ability to critique one's own circumstances–as an important source of growth and adaptation in societies (Gough et al. 2007).

Psychological needs are another important component of the WeD conception of well-being. Ryan and Sapp (2007) identify autonomy (the ability to make and achieve life goals), and relatedness (meaningful connections to other individuals and society) as necessities which must be satisfied in order to achieve well-being. As with all needs in the WeD framework, the specific ways in which they are satisfied, and their relative contributions to well-being, are socially and culturally constructed. However, it is argued that their hypothesised universality facilitates cross-cultural research. This is a clear example of how a framework's universality can be coupled with local flexibility.

Central to the WeD understanding of well-being is an extended concept of 'resources' that goes beyond possession of physical things (e.g., tools and equipment, and natural resources such as timber and water) to include the social and cultural implications and meanings attached to their possession (White and Ellison 2007). White and Ellison (2007) argue that the contribution of resources to well-being can only be understood when they are considered in relation to people and society. Emphasis on the individual's ability to command resources is especially relevant where property rights and the rule of law are ill-defined.

Application of WeD to fisheries highlights heterogeneity in the ways environmental change is experienced and well-being is pursued (Coulthard et al. 2011). For example, although the Millennium Ecosystem Assessment (2005) indicates that in aggregate those with greater socioeconomic status are more insulated from the adverse effects of environmental policy intervention, Coulthard (2008) found that in the caste-dominated fisheries management system in Tamil Nadu, it was the more powerful, wealthier households that lacked adaptive capacity. The reason, Coulthard et al. argue, is that these households were the most dependent on the status quo of the system. Using a well-being framework in this way can highlight and help explain such counterintuitive results.

SYNTHESIS

Despite some foundational differences in the various threads of the well-being literature, there are also numerous

complementarities and considerable overlap. This section synthesises lessons learned from our review of prominent well-being frameworks. The goal is to draw attention to critical elements of the interplay between ecosystem services and human well-being, and to offer insights into how this relationship can be better understood.

Constituents of well-being

Dasgupta disaggregates well-being into constituents (broad categories such as health, freedom, and security), and determinants (such as income, food, and shelter), which he refers to as "commodity inputs in the production of wellbeing" (Dasgupta 2001: 33). In this way, determinants can be thought of as means toward constituent ends of well-being. He writes that "moral and political philosophers regard the constituents as the obvious objects of study, in contrast to economists and statisticians, who gravitate towards the determinants" (Dasgupta 2001: 33). The interdisciplinary approaches adopted by the SLA and WeD entail both constituents and determinants, allowing local specification of the latter. Moreover, WeD identifies culture not only as a category of resources (within set 2 of the list below) but also as the medium through which all other well-being constituents are construed (White and Ellison 2007).

Though each framework identifies its own set of constituents there is considerable overlap, and for understanding the differentiated impacts of environmental change on the well-being of the world's poorest, they can be grouped as follows:

- Autonomy, agency, and the freedom to act
- Material wealth and access to the basic materials for a good life
- Physical and mental health
- Relations with others, culture, and socioeconomic status
- Security (cross-cutting other constituents).

This is a demanding set of constituents and in practice it can be difficult to include them all in an evaluation of the well-being effects of an intervention. However, the literature demonstrates that our understanding of well-being would be diminished by ignoring any of these groups. The specific determinants that comprise these constituents are contextually defined.

The relationship between the constituents of well-being (including the natural environment) is perhaps best explained through an example. Pollnac and Poggie (2008) argue that the act of fishing is not merely an allocation of labour, but is a crucial component of individual and collective identities: not a livelihood, but a lifestyle. Their research concludes that the reluctance of fishermen to participate in alternative livelihood schemes stems from a cultural attachment to the masculinity of the hunt. Put in more general terms, if alternative income projects are to be successful they must account for these non-income components of individual and collective preferences. Thus, in at least some circumstances, losses in the fourth set of well-being constituents (relations with others, culture, and socioeconomic status) dominate gains in the second set of constituents (material wealth and basic materials), provided individuals have sufficient health, autonomy, agency, and freedom to act (the third and first sets, respectively) as well as security (fifth set).

Security as a key constituent of well-being

Security, as a cross-cutting issue, is particularly worth highlighting with respect to the well-being of the poor. Gough et al. (2004) identify three types of security regimes: insecurity regimes, dependent security regimes, and welfare state regimes, which are relevant for the developing world. Insecurity regimes comprise those where powerful external players juxtaposed with weak internal actors generate a chronic state of uncertainty and political instability leaving individuals and communities extremely vulnerable. In dependent security regimes, poor people secure some measure of informal protection and predictability in return for dependence on patrons. However, their patron-client dependence sets up conditions for longer-term insecurity. In 'welfare state regimes' formal labour markets and democratic processes mean people have recognised rights to a range of taxpayer-funded social services and benefits including provision for security needs.

Given our focus it is important to note that if the environment itself were the referent object of security, it too could be conceived of within these regimes. In an insecurity regime, the object to be secured--be it the environment or people--has little protection of any type; is highly vulnerable, and often destroyed. In a dependent security regime, the environment may be protected so long as it meets certain (often economic) criteria and performs specified functions. An example would be wildlife conservancies established on private land and underpinning tourism enterprises, such as the Mara conservancies in Kenya (Homewood et al. 2012). Finally, by analogy with WeD's 'welfare state regime', the environment may be protected under strict conservation rules, with the state establishing taxpayer-funded national parks and protected areas.

The environment itself is also a potential driver of insecurity, which can be nonlinear and catastrophic. Environmental tipping points can have dire consequences for human well-being. For example, floods are cited as primary causes of cholera outbreaks in Djibouti, Somalia, Kenya, Tanzania, and Mozambique (Millennium Ecosystem Assessment 2005). Similarly, eutrophication and hypoxia can lead to dead zones (Diaz and Rosenberg 2008), fisheries collapse can lead to sudden losses not only of provisioning and regulating services (Pinsky et al. 2011) but also livelihoods and community identities (Pollnac and Poggie 2008), and trade in bushmeat can precipitate tipping points for interspecies disease transmission and species loss (Smith et al. 2009).

The importance of scale

The Millennium Ecosystem Assessment (MA) carried out both a global assessment and 33 sub-global assessments (SGAs)

to elucidate the ways in which scale affects our perception and understanding of the relationships between well-being and ecosystem services (Millennium Ecosystem Assessment 2005). SGAs comprised small communities, cities, countries, and international regions, with some nesting, and revealed that although there was considerable overlap between scales, local results did not always coincide with global predictions. This reinforces the need for local flexibility within well-being frameworks.

In aggregate, the MA finds that as a result of increased nutrition and material wealth, changes in ecosystem services have typically increased human well-being, and in many cases substantially so. However, it also cautions that these gains are unsustainable (15 of the 24 services examined were classed as degraded) and distributed unequally. This skewed distribution of gains and losses from ecosystem service change is a pervasive theme throughout the MA. Human, physical, and social capital are cited as intermediaries dampening the adverse effects of service loss on human well-being. However many of the world's poorest people lack the access, agency, and autonomy required to deploy these capitals as resources in the pursuit of well-being. The effects of changes in ecosystem services on well-being are contingent upon the adaptive capacity of those affected, which in turn depends on other components of well-being (Millennium Ecosystem Assessment 2005).

Timescale also matters, and interacts with security on several dimensions. Autonomy may be sacrificed in the short term for dependent security and its perceived contribution to well-being may differ between observers and participants. This dependent security can precipitate clientelism; a process that Wood describes as "ultimately disabling" and which "repeatedly forecloses future options for autonomous security" (Wood 2007: 118). Thus, for many, the exigency of insecurity can force situations in which securing present well-being involves sacrificing the future. This has direct parallels for the natural environment; current overexploitation limits future living standards.

The spatial and temporal scale of analysis therefore has important implications for defining and measuring well-being and interpreting results. In part, this is due to differences in the types of questions that can be asked and the information that can be analysed at individual, community, national, and international levels, and through time. This illustrates a potential need for conceptual frameworks to treat individual and national well-being explicitly and differently, as well as considering how change through time may realistically be tracked. The components of well-being and their relative importance not only change depending on whose well-being we wish to assess (individuals, households, communities, national, global; Daw et al. 2011; Millennium Ecosystem Assessment 2005), but also with respect to age (Ryan and Deci 2001; Bevan 2007; Blanchflower and Oswald 2008), gender (Sokoya et al. 2005), culture (Bevan 2007), and time span considered. The Easterlin Paradox, for example demonstrates that moving from the global to national scale can overturn key relationships, such as that between income and happiness.

International comparisons of interactions between ecosystem services and well-being are problematic due to the context-specific nature of these interactions and interventions affecting them (Adams et al. 2004; Bateman et al. 2011). Aggregations can obscure individual winners and losers from environmental change by oversimplifying or overlooking the dynamic elements of access to ecosystem services, individually differentiated experiences, and local constructs of well-being, and by making misleading generalisations about the relationship between poverty and the natural environment (Daw et al. 2011). These challenges can be addressed by employing a universal framework with the flexibility to incorporate both local and higher scale contexts, as advocated in the WeD framework (Schmidt and Bullinger 2007).

DISCUSSION AND CONCLUSION

As well as the key constituents of autonomy, material resources, health, social relations, security and the key dimensions of spatial and temporal scale, general principles emerge from this review of different approaches to understanding well-being with respect to environmental change. In this concluding discussion we explore the need for interdisciplinarity; for flexible frameworks balancing subjective vs objective, emic vs etic understandings; and for understanding social context and relative well-being when evaluating the well-being impacts of environmental change.

Interdisciplinarity

In the early poverty literature, ontological assumptions arising from disciplinary biases, limited researchers' and policy makers' understanding of development. A renewed emphasis on the importance of interdisciplinary or even trans-disciplinary collaboration among social anthropologists, economists, psychologists, and political scientists has broadened the scope of investigation into the human condition (Sayer 1999; Bevan 2007).The importance of this trend is evident in the work of Sen (1981), Dasgupta (2001), and Layard (2005); the HDI (UNDP 1990); various sustainable livelihood projects (Scoones 1998; Hussein 2002); and the MDGs (UN 2002). However, despite facilitating interdisciplinary collaboration within the social sciences, this process had little success in forging links between social scientists and conservationists (Büscher and Wolmer 2007). The current discussion around developing new sustainable development goals is an opportunity to build such collaboration, for example through recognising the important role of improved fisheries management for the continued well-being of poor people in developing countries (Mohammed 2014).

Several frameworks, including SLA and WeD, assert that further collaboration between natural and social scientists is crucial for understanding the differentiated impacts of environmental changes on the world's poorest

(Millennium Ecosystem Assessment 2005; Pollnac and Poggie 2008; Coulthard 2008; Coulthard et al. 2011). While WeD emphasises the social sciences (McGregor 2007), the inclusion of the ecosystem services represents a valuable extension to researchers' understanding of how well-being relates to the natural environment. For example, where material wealth, access to basic materials, and cultural and socioeconomic relationships rely directly on hunting and fishing, the natural and social sciences inevitably intersect. Thus, there is a need for greater collaboration between conservation ecologists and social scientists (Milner-Gulland 2012).

Flexible frameworks for multiple objective and subjective dimensions

Integrating these interdisciplinary contributions exposes a conception of well-being in which each component can and must be viewed simultaneously through objective, subjective, and relational lenses (McGregor and Sumner 2010). Objective components such as health indicators, income, and education facilitate international and intertemporal comparisons. However, for understanding individual and shared well-being, subjective evaluations and interpretations of these circumstances are necessary. There are important heterogeneities in the ways different individuals experience similar circumstances. A purely objective stance has difficulty capturing these differences.

Clearly, this is an ideal to be pursued, and operationalising such an approach will be difficult. In practice, conservationists, policy makers, development agencies, NGOs, and academics have limited resources and multiple objectives. The integration of well-being into their operations will be subject to power dynamics and political interests. However, though difficult, it remains possible to operationalise the subjective in real world empirical studies: the WHOQOL questionnaires used by the World Health Organisation to elicit a cross-cultural understanding of health-related quality of life and the NEF's experienced well-being and Happy Planet Index are two examples (WHOQOL 1998; NEF 2012). Finally, the relational dimension captures the psychological need for fruitful connections to others and how social structure can influence the definition of 'the good life'. Instrumental here is the recognition that what constitutes a high standard of living, and how this is achieved, differs considerably across time, space, and culture. Ignoring these dimensional nuances severely restricts the conceptualisation and understanding of (changes in) well-being.

Incorporating multiple dimensions in a conception of well-being that permits international and intertemporal comparisons requires a universal framework with sufficient flexibility to capture the local nature of well-being (Schmidt and Bullinger 2007). The SLA and WeD take this approach; however, more applications and case studies are needed to determine how well these frameworks perform when comparing well-being between countries and over time.

Context and relational well-being

Well-being can be meaningfully understood only when its subjective, objective, and relational components are recognised in an integrated way. The influence of culture and society on subjective evaluations of objective circumstances means that a framework for assessing well-being must include both etic, external, universal components as well as emic, individual, contextually specific components (McGregor 2007). This is particularly the case for the world's poorest populations whose ways of life are most directly dependent on ecosystem services.

SLAs, domains of life, and WeD all emphasise the role of relationships and social comparisons. Historically, technical quantitative studies have failed to capture these key dimensions of well-being, and they have much to gain, and much to learn from the long tradition of qualitative inquiry that reaches back at least as far as Aristotle (Gough and McGregor 2007; Drury et al. 2011). Directly addressing the role of relative socioeconomic status in people's conception of their own well-being is necessary for a full understanding of well-being. Dolan et al. (2006) highlight how reference standards can influence self-reported well-being. For example, relevant comparisons may include: to others in one's household; to the average American, Ethiopian, or global citizen; to oneself last month, last year, or last election cycle; or indeed they could be aspirational in nature–compared to how the respondent had expected things to turn out (Graham and Pettinato 2002). Such different reference points may lead to significant differences in self-reported well-being. The Happy Planet Index, for example, asks individuals to place themselves on a scale of 0 (the worst possible life) to 10 (the best possible life), but across countries, the two ends of this ladder are placed in wildly different contexts: the bounds of possibility in an overcrowded refugee camp will differ from those in the Hamptons.

The frameworks reviewed here dictate that relative position is important for understanding well-being, highlighting the Easterlin Paradox. Heterogeneity in the experience and pursuit of well-being can produce situations in which trade-offs between subsections of society are zero-sum; enhancing well-being for some entails reducing it for others. This is a common problem in economics in which Pareto efficient allocations may be unfair, and socially and politically unsustainable. Such situations highlight the importance of governance and social contracts over distribution, equality, and fairness. For example, Graham and Felton (2006), and Graham (2009) find that the effect of inequality on happiness in the USA and Europe is minor and insignificant, but that in Latin America it decreases well-being for the poor and increases it for the rich. A potential explanation of these differences is that in developed countries, inequality reflects opportunity and social mobility while in poor countries, it reflects persistent and asymmetric social disadvantage (Alesina et al. 2004; Graham and Felton 2006; Graham 2009).

This further underlines the central importance of contextual sensitivity in understanding well-being. For economists, the spatial dependence of ecosystem service provision is firmly

established (Pearce 1998; Toman 1998; Bateman et al. 2011; UK-NEA 2011). Similarly, the idea that ecosystem services and human well-being affect each other in contextually specific ways is also gaining traction in the ecological and conservation sciences (Adams et al. 2004; Daw et al. 2011; Mace et al. 2011; Milner-Gulland 2012). Further still, the placement of individuals, and indeed societies as a whole, within their cultural, political, religious, institutional, and socio-economic circumstances is essential to understanding their individual and shared well-being, and the experienced meaning of any change (Ryan and Deci 2001; Bevan 2007). Thus, of the potential strategies for describing well-being, a hybrid approach between micro and macro scales may be most useful for understanding relationships between well-being and ecosystem services. The WeD framework offers the necessary flexibility to operationalise such a hybrid.

The policy context in which environmental changes take place can also have significant implications for human well-being. Policies such as the introduction of PES or protected areas represent significant interventions usually designed to meet multiple (and often conflicting) social, political, economic, and environmental objectives (Millennium Ecosystem Assessment 2005; Jordan et al. 2010). Although they vary in terms of the agents who develop them (such as local, national, and international governments, businesses, civil society organisations, or NGOs), the specific people and places they affect most, and the time period over which their impacts are felt, many of these policies share a common result: the poorest, whose livelihoods are typically most dependent on ecosystem services (TEEB 2010), are often marginalised (Millennium Ecosystem Assessment 2005). We suggest here that one reason for this marginalisation is a weak understanding of the interplay between ecosystems services interventions and their impact on the poor and the environments in which they live.

Our review suggests that a strong candidate for evaluating the impact of policy-driven and natural environmental change on people is its effect on well-being. For the world's poorest, whose well-being is often most dependent on ecosystem services, the impact of environmental change is often differentiated not only across age, livelihood, and gender, but also across culture and socio-economic status. Adequately capturing these differences requires a deep understanding of local conditions and of the structure and dynamics of social-ecological systems. Such an approach could be useful in designing and evaluating the SDGs and the post-2015 development agenda. Those interested in assessing well-being need to identify its contextually relevant constituents, and incorporate its objective, subjective, and relational components. Simple uni-dimensional representations of the impacts of environmental change on humans are no longer adequate for the evaluation or design of interventions.

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REFERENCES

Adams, W.M., R. Aveling, D. Brockington, B. Dickson, J. Elliott, J. Hutton, D. Roe, et al. 2004. Biodiversity conservation and the eradication of poverty. *Science* 306: 1146–1149.

Adger, W.N. and A. Winkels. 2014. Vulnerability, poverty and sustaining well-being. In: *Handbook of sustainable development* (eds. Atkinson, G., S. Dietz, E. Neumayer, and M. Agarwala). 2nd edition. Cheltenham: Edward Elgar.

Alesina, A., R. Di Tella, and R. MacCulloch. 2004. Inequality and happiness: are Europeans and Americans different? *Journal of Public Economics* 88: 2009-2042.

Alkire, S. and J. Foster. 2011. Counting and multidimensional poverty measurement. *Journal of Public Economics* 95(7): 476–487.

Allison, E.H. and F. Ellis. 2001. The livelihoods approach and management of small-scale fisheries. *Marine Policy* 25: 377–388.

Allison, E.H. and B. Horemans. 2006. Putting the principles of the sustainable livelihoods approach into fisheries development policy and practice. *Marine Policy* 30: 757–766.

Angelsen, A. 2008. In: *Moving ahead with REDD: issues, options and implications* (ed. Angelsen, A.). Bogor, Indonesia: CIFOR.

Bateman, I.J., G.M. Mace, C. Fezzi, G. Atkinson, and K. Turner. 2011. Economic analysis for ecosystem service assessment. *Environmental and Resource Economics* 48: 177–218.

Bevan, P. 2007. Researching wellbeing across the disciplines: some key intellectual problems and ways forward. In: Wellbeing in developing countries (eds. Gough, I. and J.A. McGregor). Pp. 283–316. New York, NY: Cambridge University Press.

Blanchflower, D.G. and A.J. Oswald. 1996. *The rising well-being of the young*. In: NBER Conference on Disadvantaged Youth, North Carolina, USA.

Blanchflower, D.G. and A.J. Oswald. 2008. Is wellbeing U-shaped over the life cycle? *Social Science and Medicine* 66: 1733–1749.

Blanchflower, D.G., A.J. Oswald, and P.B. Warr. 1993. Wellbeing over time in Britain and the USA. In: *Economics of Happiness*. London: London School of Economics and Political Science.

Boarini, R., Å. Johansson, and M.M. d'Ercole. 2006. *Alternative measures of wellbeing*. OECD Publishing.

Brocklesby, M.A. and E. Fisher. 2003. Community development in sustainable livelihoods approaches – an introduction. *Community Development Journal* 38: 185-198.

Büscher, B. and W. Wolmer. 2007. Introduction: the politics of engagement between biodiversity conservation and the social sciences. *Conservation and Society* 5(1): 1.

Campbell, A. 1976. Subjective measures of wellbeing. *American Psychologist* 31: 117.

Cardinale, B.J., J.E. Duffy, A. Gonzalez, D.U. Hooper, C. Perrings, P. Venail, A. Narwani, et al. 2012. Biodiversity loss and its impact on humanity. *Nature* 486: 59.

Chambers, R. and G. Conway. 1992. *Sustainable rural livelihoods: practical concepts for the 21st century*. Brighton: Institute for Development Studies.

CIFOR (Center for International Forestry Research). 2007. *Towards wellbeing in forest communities: A source book for local government*. CIFOR, Bogor, Indonesia.

Clark, A.E., P. Frijters, and M.A. Shields. 2008. Relative income, happiness, and utility: an explanation for the Easterlin Paradox and other puzzles. *Journal of Economic Literature* 46: 95–144.

Clements, T. and E.J. Milner-Gulland. 2014. The impacts of payments for environmental services and protected areas on local livelihoods and forest conservation in northern Cambodia. *Conservation Biology* 29(1): 78–87.

Corbera, E. 2012. Problematizing REDD+ as an experiment in payments for ecosystem services. *Current Opinion in Environmental Sustainability* 4: 612-619.

Costanza, R., I. Kubiszewski, E. Giovannini, H. Lovins, J. McGlade, K.E. Pickett, K. Ragnarsdóttir, et al. 2014. Time to leave GDP behind. *Nature* 505(7483): 283–285.

Coulthard, S. 2008. Adapting to environmental change in artisanal fisheries: insights from a South Indian lagoon. *Global Environmental Change* 18: 479–489.

Coulthard, S., D. Johnson, and J.A. McGregor. 2011. Poverty, sustainability and human wellbeing: a social wellbeing approach to the global fisheries crisis. *Global Environmental Change* 21: 453–463.

Cummins, R.A. 1996. The domains of life satisfaction: an attempt to order chaos. *Social Indicators Research* 38: 303–328.

Dasgupta, P. 2001. *Human wellbeing and the natural environment*. Oxford: Oxford University Press.

Dasgupta, P. 2003. Population, poverty, and the natural environment. In: *Handbook of environmental economics* (eds. Mäler, K.G. and J.R. Vincent). Boston, MA: Elsevier North-Holland.

Daw, T., K. Brown, S. Rosenfo, and R. Pomeroy. 2011. Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human wellbeing. *Environmental Conservation* 38: 370–379.

Di Tella, R. and R. MacCulloch. 2006. Some uses of happiness data in economics. *Journal of Economic Perspectives* 20: 25–46.

Di Tella, R. and R. MacCulloch. 2008. Gross national happiness as an answer to the Easterlin Paradox? *Journal of Development Economics* 86: 22–32.

Diaz, R. J. and R. Rosenberg. 2008. Spreading dead zones and consequences for marine ecosystems. *Science* 321: 926-929.

Dolan, P., T. Peasgood, and M. White. 2006. Review of research on the influences on personal wellbeing and application to policy making. Report to Defra. London: Defra.

Doyal, L. and I. Gough. 1991. *A theory of human need*. London: Macmillan.

Drury, R., K. Homewood, and S. Randall. 2011. Less is more: the potential of qualitative approaches in conservation research. *Animal Conservation* 14: 18–24.

Easterlin, R.A. 1974. Does economic growth improve the human lot? In: *Nations and households in economic growth: essays in honor of Moses Abramovitz* (eds. David, P. and M. Reder). New York, NY: Academic Press.

Easterlin, R.A. 1995. Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization* 27: 35–47.

Easterlin, R.A., L.A. McVey, M. Switek, O. Sawangfa, and J.S. Zweigh. 2010. The happiness-income paradox revisited. *Proceedings of the National Academy of Sciences of the United States of America* 107: 22463–22468.

Engel, S., S. Pagiola, and S. Wunder. 2008. Designing payments for environmental services in theory and practice: an overview of the issues. *Ecological Economics* 65: 663–674.

Farley, J. and R. Costanza. 2010. Payments for ecosystem services: from local to global. *Ecological Economics* 69: 2060-2068.

Fisher, J.A., G. Patenaude, P. Meir, A.J. Nightingale, M.D.A. Rounsevell, M. Williams, and I.H. Woodhouse. 2013. Strengthening conceptual foundations: analysing frameworks for ecosystem services and poverty alleviation research. *Global Environmental Change* 23(5): 1098–1111.

Fox, J. 2012. The economics of wellbeing: have we found a better gauge of success than GDP? *Harvard Business Review* 79: 80–83.

GEF (Global Environment Facility). 2012. Land use, land-use change, and forestry (LULUCF) activities. Washington, DC: Professional Graphics Printing Co.

Gómez-Baggethun, E., R. de Groot, P. L. Lomas, and C. Montes. 2010. The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. *Ecological Economics* 69: 1209–1218.

Gönner, C., M. Haug, A. Cahyat, E. Wollenberg, W. de Jong, G. Limberg, P. Cronkleton, et al. 2007. Capturing nested spheres of poverty: a model for multidimensional poverty analysis and monitoring. CIFOR Occasional Paper No. 46.

Gough, I. and J.A. McGregor. 2007. *Wellbeing in developing countries: from theory to research*. Cambridge: Cambridge University Press.

Gough, I., J.A. McGregor, and L. Camfield. 2007. Theorising wellbeing in international development. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor) New York, NY: Cambridge University Press.

Gough, I., G. Wood, A. Barrientos, P. Bevan, P. Davis, and G. Room. 2004. *Insecurity and welfare regimes in Asia, Africa and Latin America*. Cambridge: Cambridge University Press.

Graham, C. 2009. *Happiness around the world: the paradox of happy peasants and miserable millionaires*. Oxford: Oxford University Press.

Graham, C. and A. Felton. 2006. Inequality and happiness: insights from Latin America. *The Journal of Economic Inequality* 4: 107–122.

Graham, C. and S. Pettinato. 2002. Frustrated achievers: winners, losers and subjective wellbeing in new market economies. *The Journal of Development Studies* 38: 100–140.

Griggs, D., M. Stafford-Smith, O. Gaffney, J. Rockström, M.C. Öhman, P. Shyamsundar, W. Steffen, et al. 2013. Policy: sustainable development goals for people and planet. *Nature* 495(7441): 305–307.

Heller, N.E. and E.S. Zavaleta. 2009. Biodiversity management in the face of climate change: a review of 22 years of recommendations. *Biological Conservation* 142: 14–32.

Hussein, K. 2002. *Livelihoods approaches compared*. London: Department for International Development.

Homewood, K.M., P.C. Trench, and D. Brockington. 2012. Pastoralist livelihoods and wildlife revenues in East Africa: a case for coexistence? *Pastoralism* 2(19): 1–23.

Jack, B.K., C. Kousky, and K.R.E. Sims. 2008. Designing payments for ecosystem services: lessons from previous experience with incentive-based mechanisms. *Proceedings of the National Academy of Sciences* 105: 9465–9470.

Jordan, S.J., S.E. Hayes, D. Yoskowitz, L.M. Smith, J.K. Summers, M. Russel, and W.H. Benson. 2010. Accounting for natural resources and environmental sustainability: linking ecosystem services to human wellbeing. *Environmental Science and Technology* 44: 1530–1536.

Layard, R. 2005. *Happiness: lessons from a new field*. London: Penguin Books.

Mace, G.M., I.J. Bateman, S. Albon, A. Balmford, C. Brown, A. Church, R. Haines-Young, et al. 2011. Conceptual Framework and Methodology. In: *The UK National Ecosystem Assessment Technical Report.* Cambridge: UK National Ecosystem Assessment, UNEP–WCMC.

MacKerron, G. 2011. Happiness economics from 35000 feet. *Journal of Economic Surveys* 26(4): 705–735.

McGregor, J.A. 2007. Researching wellbeing: from concepts to methodology. In: *Wellbeing in developing countries.* (eds. Gough, I. and J.A. McGregor). New York, NY: Cambridge University Press.

McGregor, J.A. and A. Sumner. 2010. Beyond business as usual: what might 3-D wellbeing contribute to MDG momentum? *IDS Bulletin* 41: 104–112.

Milder, J.C., S.J. Scherr, and C. Bracer. 2010. Trends and future potential of payment for ecosystem services to alleviate rural poverty in developing countries. *Ecology and Society* 15: 4.

Millennium Ecosystem Assessment. 2005. *Ecosystems and human wellbeing: synthesis*. Washington, DC: Island Press.

Milner-Gulland, E.J. 2012. Interaction between human behaviour and ecological systems. *Philosophical Transactions of the Royal Society of Biological Sciences* 367: 270–278.

Mohammed, E. 2014. Fisheries and the post-2015 development agenda. In: IIED Briefing. London: International Institute for Environment and Development. http://pubs.iied.org/pdfs/17203IIED.pdf? January 2014.

NEF. 2009. *National accounts of wellbeing: bringing real wealth onto the balance*. London: New Economics Foundation.

NEF. 2011. *Measuring our progress: the power of wellbeing*. London: New Economics Foundation.

NEF. 2012. *The Happy Planet Index: 2012 report. A global index of sustainable wellbeing*. London: New Economics Foundation.

Oswald, A.J. 1997. Happiness and economic performance. *The Economic Journal* 107: 1815–1831.

Pearce, D. 1998. Auditing the earth: the value of the world's ecosystem services and natural capital. *Environment: Science and Policy for Sustainable Development* 40: 23–28.

Pinsky, M.L., O.P. Jensen, D. Ricard, and S.R. Palumbi. 2011. Unexpected patterns of fisheries collapse in the world's oceans. *Proceedings of the National Academy of Sciences* 108: 8317–8322.

Pollnac, R.B. and J.J. Poggie. 2008. Happiness, wellbeing and psychocultural adaptation to the stresses associated with marine fishing. *Human Ecology Review* 15: 194–200.

Rojas, M. 2007. The complexity of wellbeing: a life-satisfaction conception and a domains-of-life approach. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor). New York, NY: Cambridge University Press.

Ryan, R.M. and E.L. Deci. 2001. On happiness and human potentials: a review of research on hedonic and eudaimonic wellbeing. *Annual Review of Psychology* 52: 141–166.

Ryan, R.M. and A.R. Sapp. 2007. Basic psychological needs: a self-determination theory perspective on the promotion of wellness across development and cultures. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor). New York, NY: Cambridge University Press.

Sayer, A. 1999. For postdisciplinary studies: sociology and the curse of disciplinary parochialism/imperialism. In: *Sociology: legacies and prospects* (eds. Eldridge, J., J. MacInnes, S. Scott, C. Warhurst, and A. Witz). Durham: Sociology Press.

Schmidt, S. and M. Bullinger. 2007. Cross-cultural quality of life assessment approaches and experiences from the health care field. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor) New York, NY: Cambridge University Press.

Schreckenberg, K., I. Camargo, K. Withnall, C. Corrigan, P. Franks, D. Roe, L. M. Scherl, et al. 2010. *Social assessment of conservation initiatives: a review of rapid methodologies.* London: IIED.

Scoones, I. 1998. *Sustainable rural livelihoods: a framework for analysis*. Brighton: Institute of Development Studies.

Scoones, I. 2009. Livelihoods perspectives and rural development. *The Journal of Peasant Studies* 36: 171–196.

Sen, A. 1981. Ingredients of famine analysis: availability and entitlements. *The Quarterly Journal of Economics* 96: 433–464.

Sen, A. 1985. Wellbeing, agency and freedom: the Dewey lectures 1984. *The Journal of Philosophy* 82(4): 169–221.

Smith, K.F., K. Acevedo-Whitehouse, and A.B. Pedersen. 2009. The role of infectious diseases in biological conservation. *Animal Conservation* 12: 1–12.

Sokoya, G.O., N. Muthukrishna, and S.J. Collings. 2005. Afrocentric and gendered constructions of psychological wellbeing in Nigeria: a case study. *Journal of Psychology in Africa* 15: 31–40.

Stern, N. 2009. Policies to reduce emissions. In: *A blueprint for a safer planet*. Pp. 99–123. London: The Bodley Head.

Stiglitz, J.E., A. Sen, and J.-P. Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Paris, France.

TEEB. 2010. The economics of ecosystems and biodiversity: mainstreaming the economics of nature: a synthesis of the approach, conclusions and recommendations of TEEB.

Toman, M. 1998. Why not to calculate the value of the world's ecosystem services and natural capital. *Ecological Economics* 25: 57-60.

UK-NEA. 2011. The UK National Ecosystem Assessment. Cambridge: UNEP-WCMC.

UN. 2002. Implementation of the United Nations Millennium Declaration A/57/270. New York: United Nations General Assembly.

UN. 2013. *A new global partnership: eradicate poverty and transform economies through sustainable development. The report of the high-level panel of eminent persons on the post-2015 development agenda*. New York, NY: United Nations Publications.

UNDP. 1990. *Human Development Report*. New York, NY: Oxford University Press.

Wackernagel, M. and W. Rees. 1998. *Our Ecological Footprint: reducing human impact on the earth*. Gabriola Island, BC: New Society Publishers.

West, P., J. Igoe, and D. Brockington. 2006. Parks and peoples: the social impact of protected areas. *Annual Review of Anthropology.* 35: 251–277.

White, S. and M. Ellison. 2007. Wellbeing, livelihoods and resources in social practice. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor). New York, NY: Cambridge University Press.

WHOQOL. 1998. World Health Organization Quality of Life: user manual. Geneva, Switzerland: World Health Organization.

Wood, G. 2007. Using security to indicate wellbeing. In: *Wellbeing in developing countries* (eds. Gough, I. and J.A. McGregor). New York, NY: Cambridge University Press.

World Bank and FAO. 2009. The sunken billions: the economic justification for fisheries reform. Washington, DC: The World Bank.

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