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RESILIENCE AND WELLBEING FOR SUSTAINABILITY

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Introduction

Wellbeing and resilience are already central to debates on how to achieve sustainable development alongside the eradication of poverty (Brown, 2016), and are evident in the articulation of the UN's Agenda 2030 and the Sustainable Development Goals (SDGs). Therefore, they could become instrumental in developing approaches and interventions to implement the SDGs, as they represent language that is already familiar to key actors and audiences. For example, they are embedded in the sustainable development discourses and programming of international agencies such as FAO and the World Bank, bilateral aid organisations such as DFID and USAID, major NGOs (International Red Cross, World Food Programme), as well as many philanthropic organisations.

Wellbeing concepts (see Coulthard et al., this volume) can give insights into individuals' choices and behaviour (Armitage et al., 2012). As behaviour can be understood as the pursuit of wellbeing (Coulthard, 2012), wellbeing should not be conceived only as an outcome, but must also be understood as a process (Gough et al., 2007). Yet more dynamic approaches to wellbeing have only recently started to emerge in the literature (e.g. Coulthard, 2011; White, 2010). Resilience – broadly defined as the ability to successfully deal with change – brings insights from complex systems and provides a way of understanding change as non-linear, across scales, and in multiple dimensions (Brown, 2016). A resilience perspective on social-ecological systems (Reyers and Selomane, this volume) elicits an integrated systems-based view of how human society is linked with ecosystem change, and how change occurs within that linked system. However, resilience has been critiqued for its insufficient engagement with aspects of the social system, such as agency, that shape people's ability to respond to these changes (Brown and Westaway, 2011).

Although wellbeing and resilience approaches are rooted in quite distinct disciplinary traditions, they may complement each other, because resilience brings a

TABLE 17.1 Key resilience concepts

Resilience concept	*Definition*
Resilience	The ability to successfully deal with change. It is a characteristic that can be applied to individuals, communities, states, ecosystems or linked social-ecological systems (Brown, 2016: 2)
Persistence	Absorbing disturbance and maintaining a status quo. Persistence involves 'conserving what you have and recovering to what you were' (Folke et al., 2010: 1)
Adaptation	Adjusting to responses to changing external drivers and internal processes and thereby allowing for development along a current trajectory (Folke et al., 2010: 6)
Transformation	Profound 'shifts in perception and meaning, social network configurations, patterns of interactions among actors including leadership and political and power relations, and associated organisational and institutional arrangements' (Folke et al., 2010: 5)
Feedback loops	Closed sequences of causes and effects (Richardson and Pugh, 1981: 4)
Tipping points and thresholds	The point at which one relatively stable state or regime gives way to another (Kinzig et al., 2006: 20)

dynamic view of complex systems and can thus enhance emerging notions of wellbeing as process, while the social theories underpinning wellbeing work can assist the better integration of social concepts (e.g. agency) into resilience thinking. Resilience scholars draw on concepts from systems science to unpack how society and the environment might respond to change (Table 17.1), which can occur suddenly or gradually and can be environmental, social, economic or political in nature. These concepts can be instrumental for a more dynamic understanding of how such changes shape poor people's wellbeing over time, their ability to benefit from ecosystem services and their capacity for resilience.

This chapter explores the application of resilience and wellbeing concepts in research funded within the Ecosystem Services for Poverty Alleviation (ESPA) programme, and situates it within the wider literature to ascertain how these concepts might inform the future sustainable development agenda. Our analysis elucidates four themes that inform and illustrate some of the existing challenges around ecosystem services and poverty alleviation, and provides important insights for the contemporary sustainability agenda. The analysis highlights the following: politics, power and representation; multiple values attributed to ecosystem services and wellbeing and how they are often shaped by external factors; complex interaction and reciprocity between human and natural systems; and the scale at which these interactions unfold. These are all critical if we are to find sustainable development solutions that leave no one behind.

Power, politics and representation

Fisher et al.'s (2013) synthesis of frameworks for ecosystem services and poverty alleviation proposes that resilience approaches rarely address issues of politics and agency at collective and individual scales. This gap in understanding is empirically probed by studies that explore how resilience concepts of persistence, adaptation and transformation interact with issues of agency, capability, freedom and power over change in ecosystem services. For example, Coulthard (2011) suggests that the resilience of social and ecological systems depends on the power of multiple interests to participate in changing the institutions that influence how ecosystem services are managed. Adams et al.'s (2013a) analysis shows how transformation of land use in Bangladesh, for food security and generation of foreign currency, transfers the benefits of ecosystem services to powerful groups, rather than those living in poverty. This highlights how outside interests can shift a system into less desirable states for those who lack power to shape decision making yet critically depend on appropriated ecosystem services for their wellbeing.

Due to these complex and multi-layered mechanisms at play, it is essential to disaggregate the benefits of ecosystem services with regard to different groups of society who share them unevenly (Daw et al., 2011). Disaggregation is perceptive of change (environmental, social, economic, etc.), social difference and power asymmetries that mediate access to ecosystem services. For example, although the aggregate availability of a service may be unchanged, the processes, mechanisms and institutions governing access to and use of these services may change and, in turn, alter the distribution of benefits, creating winners and losers. Porter and colleagues (2008) illustrate this by highlighting how global demand for octopus has led to the commodification of this service and a consequent shift in local access dynamics, whereby men displaced women from performing the traditional livelihood activity of tapping octopus in inshore waters. Women, constrained by cultural codes of conduct, were no longer able to maintain access to the fishery, although the total availability of octopus remained unchanged. Access is thus mediated by a variety of mechanisms, including customary tenure regimes (Coulthard et al., 2011) and social relationships (Adams et al., 2013b). Traditional and customary access rights of the poor, however, are challenged by legalised formal claims of more powerful, often external, actors towards previously common land or resources as a result of their monetisation or conversion into more lucrative uses (Humphreys Bebbington, 2013), leading to the dispossession of the poor and their exclusion from ecosystem benefits.

Analysis of trade-offs across multiple scales generates important insights into the disaggregated distributional impacts of interventions in ecosystem services management (Dawson and Martin, 2015; Vira et al., 2012). For example, Dawson and Martin (2015) use the example of the suffering of indigenous Twa, caused by the deforestation of the Gishwati Forest, Rwanda, to analyse the ways in which social differentiation and power influence how trade-offs occur at local scales. These insights tell us that analysis of trade-offs at finer scales can enhance the potential

for interventions to better address the needs and wants of specific groups towards the ecosystem services on which they depend. While conservation and development initiatives claim to enhance wellbeing, evidence from research points to impacts contrary to this ethos. Conservation and agricultural policies that disregard existing local social and political dynamics are shown to have negative repercussions for poor people's access to land, leading to the criminalisation of traditional livelihoods and loss of vital resources (e.g. non-timber forest products) (Adams et al., 2013b; Bavinck and Vivekanandan, 2011; Broegaard et al., 2017; von Maltitz et al., 2016), creating winners and losers.

Hence, evidence from research questions the effectiveness of current approaches to devising and implementing conservation and development programmes that fail to integrate the knowledge, needs and preferences of local stakeholders who are most affected by them (e.g. Abunge et al., 2013; Adams et al., 2013b; Bavinck and Vivekanandan, 2011). This, in turn, relinquishes the poor of what Sen refers to as 'procedural control' (Sen, 1985) and has important implications for the success of such interventions (Abunge et al., 2013), as well as for procedural justice (Dawson and Martin, 2015). Participation in decision making determines the distribution

BOX 17.1 GAS EXTRACTION, POWER ASYMMETRIES AND TRANSFORMING ACCESS RIGHTS IN THE BOLIVIAN CHACO

In the Bolivian Chaco, indigenous communities face a series of challenges caused by hydrocarbon extraction, which saw the arrival of multi-national corporations welcomed by the central state. The global valuation of natural gas stands in contrast to local values and uses attached to indigenous land within the Chaco. Existing social disparities and power asymmetries between various local populations in the Chaco (such as the Weenhayek and the Guaraní), and between local and central actors within Bolivia, have deepened as a result of top-down ecosystem service governance driven by the state and hydrocarbon corporations. While compensation schemes have been put in place, these did not acknowledge existing power asymmetries or local values and meanings attached to the land in question, thus exacerbating existing inequalities and creating new divisions. As a result, the governance process designed to facilitate gas extraction gave rise to a series of procedural inequities: the property rights of hydrocarbon companies were honoured over the claims of indigenous people over land and territory, while indigenous people have not had access to important economic information. These inequities have thwarted the ability of these populations to advance their territorial claims and exercise effective control over their territories, reducing their access to vital ecosystem services, especially those linked to water.

Source: Humphreys Bebbington (2013)

of benefits, which are reflective of existing power relations. Thus failing to integrate the poor and marginalised into decision making acts to strengthen and reproduce already existing disparities and disadvantage (Daw et al., 2016; Dawson and Martin, 2015; Box 17.1; also see Dawson et al., this volume).

Multiple dimensions of ecosystem services and wellbeing

Ecosystem services research increasingly acknowledges the multi-dimensional nature of ecosystem services, which contribute to multiple aspects of wellbeing by means of multiple mechanisms (e.g. Ramirez-Gomez et al., 2015; Roe, 2014), as well as the multi-dimensional nature of poverty and wellbeing, which encompass material as well as non-material dimensions (Abunge et al., 2013; Adams et al., 2013b; Dawson et al., 2016; Roe, 2014; also see Coulthard et al., this volume). Fisher et al. (2013) also draw our attention to the role of non-ecosystem service sources. Findings from the ESPA Deltas project indeed showcase the role of remittances and off-farm labour in wellbeing creation (Adams et al., 2013b; Szabo et al., 2016).

Recent debates in ecosystem services research have recognised that ecosystem services are socially constructed and valued differently at different scales and by different groups of society (e.g. Chan et al., 2012; Dawson and Martin, 2015). Therefore, the assumption that there is a positive relationship between ecosystem services and wellbeing is overly simplistic, because dependence on ecosystem services can also act as a poverty trap (Adams et al., 2013b), and may exacerbate households' vulnerability (Suich et al., 2015). In this vein, ESPA research has identified a variety of ecosystem disservices that may hinder or harm wellbeing. Examples include conflict between humans and wildlife (Roe, 2014), zoonosis and human health (Wood et al., 2012) and agricultural intensification and access (see Martin et al., this volume). These essentially represent trade-offs between the provision of certain ecosystem services and human wellbeing, which may benefit some stakeholders (e.g. in the case of agricultural intensification) while negatively affecting others who may lose access to land (e.g. to give way for agricultural land or wildlife). A growing emphasis on the indirect benefits of many services is also evident. For example, Daw et al. (2011) critique the Millennium Ecosystem Assessment (MA) for neglecting income and employment, and call for more focus on these. Indeed, livelihoods and material wellbeing (i.e. income and employment) emerge as dominant themes within ESPA research. It is suggested that income is closely linked to other aspects of wellbeing, especially food security. As such, rising incomes should act as a buffer against the loss of traditional livelihood sources (e.g. subsistence agriculture, grazing, non-timber forest products), but evidence to support this claim remains inconclusive. Broegaard et al. (2017) and Dawson et al. (2016) use empirical evidence to demonstrate that income alone is not sufficient for food security, as a multitude of other factors (e.g. access to markets, culture and attitudes) mediate rural households' nutritional outcomes. However, Gasparatos et al. (2012) find that increased incomes do enhance food security, even when households

abandon food production in favour of cash crops. Suich et al. (2015) propose that focusing only on income could hinder our understanding of the multiple links and causal relationships between ecosystem services and wellbeing/poverty. Taking a multi-dimensional approach to the food security/income dilemma reveals the less obvious, contextual meanings attached to food production and consumption. Dawson et al. (2016) show that the poor value the traditional uses of land and livestock, as well as their pragmatic contribution to food security, and thus raising livestock also contributes to non-material aspects of wellbeing (Box 17.2). There

BOX 17.2 RAISING LIVESTOCK MEANS MORE THAN FOOD AND INCOME IN RURAL RWANDA

In recent years, rural Rwanda has seen the emergence of policies seeking to mimic the success of the Green Revolution in Asia, manifest in a top-down orchestration of technocratic solutions designed to eliminate poverty. However, Dawson and colleagues' analysis of the impact of such policies on the ground shows that agricultural intensification and a shift away from subsistence activities towards cash crops does not produce uniform outcomes for western Rwandans. They highlight that local conceptions of wellbeing differ from national-level development indicators, including material as well as non-material aspects. Data collected during interviews also revealed that ecosystem services are interlinked. For example, cultural and provisioning services go hand in hand in the context of food production, because the traditional practices involved in livestock rearing or working the land are just as important for wellbeing as the income or food obtained as a result. Thus subsistence livelihoods contribute to material and non-material dimensions of wellbeing. However, a forced shift from subsistence to cash crops means the loss of these traditions and the associated benefits. Moreover, the study demonstrates that these policies in their current form are not truly pro-poor, as they favour the less poor or slightly wealthier members of the community who are able to capitalise on existing assets, while the poor are pushed into landlessness, casual labour and struggle to adapt to the new system. The assumption that increased income leads to increased food security is challenged by this research, which shows that the poorest members of society get trapped in the vicious cycle of landlessness, inability to produce their own food, income insecurity and rising food prices. The authors conclude that caution is to be exercised in branding Green Revolution policies pro-poor, because if they do not take into account local values, priorities and aspirations, they can become as much a poverty trap for some as they are a way out of poverty for others.

Source: Dawson et al. (2016)

appears to be an interesting tension between emphasising the importance and centrality of income, cash and material wealth, while also acknowledging and highlighting the importance of non-monetary benefits and the risk of appropriation and capture of more commercialised ecosystem services by more powerful groups, to the dis-benefit of poorer groups within society.

Feedbacks between natural and human systems

Feedbacks and conditionality between ecosystem services and wellbeing have important implications for future sustainable development. Feedback dynamics provide a window to the non-linear linkages within and between ecosystem services and multiple dimensions of wellbeing. For example, von Maltitz et al.'s (2014) resilience assessment of jatropha projects in Malawi and Mozambique describes how feedback dynamics drive the collapse of the projects. While jatropha projects promised a unique opportunity to capitalise on global demands for biofuels, many have failed to deliver on initial promises of success due to feedbacks between global, national and local driving factors. These included a decline in oil prices, time lags in production due to a lengthy process of land acquisition, weak national institutions and lack of biofuel policies, as well as the lack of support for developing a local market. The concept of tipping points is also used to explain how transformation at system scales (e.g. land transformation) can manifest as economic or welfare tipping points at livelihoods scales (e.g. loss of traditional livelihoods), with either desirable or undesirable effects (Coulthard, 2012; Howard, 2013; Tanner et al., 2014). For example, Howard (2013) suggests that passing biodiversity tipping points in the Amazon, which entail the loss of species, ecosystems and ecosystem services, might cause human population collapse, forced migration and conflict. Yet, a lack of empirical evidence substantiating the cause–effect relationships inherent to feedbacks is symptomatic of limitations in the broader ecosystem service and poverty alleviation literature (Suich et al., 2015).

Food security is perhaps the greatest driver of human/ecosystem feedbacks. As Poppy et al. (2014) point out, ecosystems are vital for food production, however, food production is one of the main drivers of ecosystem degradation. Several studies highlight the complex linkages between social and ecological systems, as well as between the ecological functions that underpin the delivery of ecosystem services (e.g. Adams et al., 2013a; Amoako Johnson et al., 2016; Sjögersten et al., 2013; Zhang et al., 2015). Adams and colleagues (2013a), for example, discuss the interconnectivity between provisioning, supporting and regulating services. While agriculture seeks to maximise certain provisioning services, at the same time it disrupts vital supporting and regulating functions that underpin these, and has negative repercussions for future agricultural production and human wellbeing (Adams et al., 2013a). While these feedback loops clearly determine the future delivery of ecosystem services, the dominance of linear approaches to wellbeing/poverty and ecosystem services in research and policy continues to prevail, posing a key challenge for sustainable resource management and development.

Importantly, our analysis highlights the negative social impacts of some types of resource use and management. Pursuing economic growth through intensive forms of production or the introduction of cash crops brings a series of challenges that redefine the *modus operandi* of poor rural societies. Among other things, they challenge existing institutions of ownership and access, as well as disrupting local social and cultural norms and the moral economy (e.g. reciprocity, non-materialistic cultures, meanings attached to traditional practices) (Adams et al., 2013b; Amoako Johnson et al., 2016; Dawson et al., 2016; von Maltitz et al., 2016), thus potentially compromising social sustainability.

For example, human practices, such as agricultural intensification, driven by local and international demand for food, have hindered rural people's livelihood options (see Martin et al., this volume). Diminished livelihood diversity compromises the adaptive capacity of the poor and their resilience to global environmental change (Adams et al., 2013a; Broegaard et al., 2017). However, the impacts of human resource use may not be evident in the short term, as they unfold along different temporal (Dearing et al., 2014; Hejnowicz et al., 2015) and spatial scales (Hejnowicz et al., 2015; Howe et al., 2013). Climate change is a good example of delayed human impact (Watts et al., 2015), which poses a complex challenge for sustainability, presenting a justice dilemma (especially intergenerational) as well as a development one.

Importance of scale and change in ecosystem services for poverty alleviation

While the environment's contribution to poor people's wellbeing has been extensively addressed within and beyond ESPA research, there remains a dearth of understanding about how ecosystem services contribute to and are affected by change (e.g. of livelihoods, biodiversity), including the consequent wellbeing implications of such changes (Kent and Dorward, 2012; Roe, 2014). ESPA research addresses this by developing a better understanding of the mechanisms linking ecosystem services and wellbeing. ESPA scholars focus on two main types of mechanisms: direct use (e.g. through consumption) and exchange (e.g. through market or other trade), which are facilitated by a range of linked mechanisms – market mechanisms underpin trade and exchange, while access mechanisms mediate direct use (Abunge et al., 2013) and access to markets (Broegaard et al., 2017; van der Horst et al., 2012).

Alongside change, scale is another important factor, as decisions regarding resource management are often driven by the values and priorities of removed or external stakeholders. Humphreys Bebbington (2013) exemplifies how national state interests can place indigenous populations at a disadvantage (see Box 17.1). External factors, such as economic trends (e.g. prices, demand), can also influence locally held values of ecosystem services and penetrate local decisions about ecosystem management, transforming livelihood practices and the pathways of benefit derived from ecosystem services (i.e. from direct to exchange). For example, the increased

demand for certain crops (e.g. cash crops) or high-value resources (e.g. shrimp), combined with high prices, have led to a shift from traditional/subsistence agriculture towards more intensive forms of production (Islam et al., 2015; Szabo et al., 2016). Ecosystem services that were previously directly consumed are now traded for income (Daw et al., 2011).

Importantly, ESPA research draws attention to the interaction between scale and change in ecosystem services for poverty alleviation, and emphasizes the temporal and spatial dimensions of change. For example, Buytaert et al. (2016) find that change in local water services is difficult to determine unless weather patterns and water uses can be understood across local and regional spatial scales. These complexities can be compounded by misalignment between the temporal and spatial scales of political decision making and water basin boundaries. Elsewhere, Dearing et al. (2014) emphasise intergenerational ecosystem service issues by highlighting that decision making commonly focuses on near-term decisions rather than longer-term decisions that might support sustainability of ecosystem services. These researchers thus make an important contribution towards understanding the cross-scale dynamics of change that shape people's relationships with ecosystem services.

Resilience and wellbeing can help unpack ecosystem services for poverty alleviation

Our review demonstrates how ecosystem services for poverty alleviation research engage with concepts from the fields of resilience and wellbeing, to explain linkages and unpack non-linearities between ecosystem services and poverty alleviation. Insights from the analysis presented in this chapter clearly demonstrate the contribution of this research to critical debates around wellbeing and resilience, and showcase potential opportunities for convergence between the two frameworks. These findings suggest that although wellbeing and resilience approaches are rooted in quite distinct disciplinary traditions, they could complement each other and thereby potentially reframe how we understand the ecosystem services, wellbeing and poverty relationship.

From a static to a dynamic notion of wellbeing

Existing conceptualisations of the ecosystem services and wellbeing relationship (e.g. MA framework (MA, 2005) or the 'cascade model' (Potschin and Haines-Young, 2011)) have been widely critiqued for oversimplifying these links by presenting them in a linear fashion (Daw et al., 2011; Lele et al., 2013). Arguably, this can, in part, be attributed to static notions of wellbeing, as a state or outcome to be achieved (e.g. good health, happiness), which create fertile ground for one-directional thinking that views wellbeing as a normative end that can be achieved by means of ecosystem services. However, ecosystem services research begins to recognise the complex linkages between wellbeing and ecosystem services, and

emphasises the role of feedbacks between human and natural systems. This is also manifest in discussions of the various mechanisms by which ecosystem services can contribute to wellbeing or poverty alleviation (e.g. trade/exchange, or direct use) (Abunge et al., 2013; Broegaard et al., 2017). There is an evident departure within the ESPA programme from a linear framing of the ecosystem services and poverty alleviation relationship, by acknowledging that wellbeing is not derived from a single ecosystem service in isolation, but is rather a result of complex interactions between several services that together produce wellbeing (Fisher et al., 2013).

Thus, recent research on ecosystem services and wellbeing and poverty alleviation progresses beyond normative calls for dynamic systems perspectives, and draws on resilience theory to conceptually and empirically investigate links between ecosystem services and poverty alleviation in a much more sophisticated way. While ESPA engages with the resilience approach, this engagement does not extend to explicit resilience analyses of social-ecological systems, but instead involves the use of resilience concepts for exploring the ecosystem services and poverty alleviation relationship through a more dynamic lens. Specifically, applying concepts of shock and gradual change enabled ESPA research to gain a broader sense of the social and environmental drivers of change in ecosystem services and wellbeing (Galafassi et al., 2017). Furthermore, the concept of feedbacks has helped ESPA researchers to describe how feedback dynamics might shape the future trajectory of sustainable poverty alleviation (Gasparatos et al., 2015; Kafumbata et al., 2014). The emphasis of scale, including cross-scale power dynamics, relationships and influences, further elaborates the complex nature of interlinked human-natural systems (Daw et al., 2015; Suich et al., 2015; Villa et al., 2014). These advances indicate that integrating resilience concepts into existing ecosystem services–wellbeing frameworks could support a much-needed transition towards a more dynamic approach that conceptualises wellbeing as a process (Coulthard et al., 2011; Gough et al., 2007), rather than merely a 'static' normative goal.

Bringing social theories into resilience

Resilience thinking has developed beyond its ecological foundations to embrace a social perspective on change. The merits and pitfalls of marrying ecological and social resilience are well documented (Adger, 2000). Yet, despite recent strides to socialise resilience, resilience research is critiqued for being apolitical, for struggling to address issues of agency and for rarely acknowledging social difference (Brown, 2014; Brown and Westaway, 2011). ESPA research makes an important contribution to these unfolding debates. Coulthard (2012) applies the concept of agency to investigate how individuals pursue wellbeing preferences while simultaneously remaining resilient to environmental change. ESPA research also demonstrates the role of power in processes of ecosystems management. Powerful groups have greater opportunity to appropriate benefits from ecosystem services (Daw et al., 2011; Fisher et al., 2013). We also learn that the ability of some groups to exert more power than others over the outcomes of decision-making processes can result in the

rejection of such processes and thereby transform ecological systems to alternative, undesirable states (Adams et al., 2013b). These advances demonstrate a broadening of resilience research to acknowledge dimensions of social difference, and indicate a shift towards integrating a contextual understanding of wellbeing into the systems perspective that typically characterises resilience research.

A key principle for resilience practice is the broadening of participation in decision-making processes. Sensitive approaches that engage a diverse and representative set of stakeholders offer the potential to develop social capital for enhanced management of ecosystem services (Leitch et al., 2015). ESPA research has made important steps towards developing and applying participatory and inclusive approaches to understanding trade-offs in the ecosystem services and wellbeing relationship. As demonstrated by Daw et al. (2015) and Galafassi et al. (2017), ESPA research presents approaches that start to probe different and at times conflicting priorities, and provide a platform for marginalised views to be better incorporated into decision-making processes. Such approaches offer promising potential for the science of resilience, as they emphasise how social difference shapes resilience at specific scales. These features also establish practical ways of integrating diverse needs, wants and assumptions into decision-making processes for sustainable development.

Conclusions

Poverty and the direct dependence of the poor on ecosystem services may drive the over-exploitation of many resources in developing countries. At times exploitation takes place despite the recognition of negative impacts resulting from the activity. This raises important questions about trade-offs between ecosystem services and wellbeing, and suggests that these are bound together in a web of complex and intertwined social and ecological processes and factors that shape decisions regarding resource use and management. However, much existing empirical work tends to take a piecemeal approach, failing to fully address this complexity.

Insights from our review of ecosystem services for poverty alleviation research make important strides towards remedying this shortcoming, and unpacking the drivers and implications of a series of trade-offs in ecosystem services and wellbeing. First, we highlight that trade-offs between ecosystem services and between different wellbeing domains are driven by multiple and often competing values, preferences and needs of local and removed stakeholders, which can affect the underlying ecosystem functions and processes, and thus the system's ability to deliver a breadth of diverse services in the future, posing interesting implications for sustainability. Second, we show that trade-offs between beneficiaries are largely driven by power asymmetries that create winners and losers as a result of the unequal distribution of ecosystem benefits in favour of more powerful and better-endowed groups. These trade-offs are intimately linked to resource governance and access dynamics, and often unfold across different spatial and temporal scales. As such, they pose a complex challenge for sustainable development and poverty alleviation initiatives, and create

a justice dilemma concerning representation and participation in decisions regarding the management and use of land and resources. Thus future policy and action would benefit from an understanding of existing local practices and the integration of the needs, values and preferences of the rural poor into decision making, as an effective solution for addressing and minimising trade-offs from conservation, resource management and government policies.

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