

1 **Missing the trees for the wood: why we are failing to see success in pro-**
2 **poor conservation**

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1 **Abstract**

2 Pro-poor conservation strategies are touted as a panacea for achieving biodiversity conservation and
3 poverty reduction, yet there remains limited evidence for success in achieving these dual objectives.
4 Is this lack of evidence a sign that the approach is failing, or an indicator that we are not capturing
5 appropriate measures of success? In this review, we demonstrate that the lack of evidence for
6 success in pro-poor conservation can be attributed to focusing on the bigger picture and overlooking
7 the details. This has led to two fundamental flaws: 1) an ambiguous use of definitions, and 2)
8 inappropriate monitoring, both of which are compounded by limited understanding between
9 traditional scientific disciplines, and which render true conclusion of success impossible. The current
10 lack of evidence risks basing decisions on belief rather than evidence, repeating mistakes, and
11 missing opportunities to replicate successes. We propose five key recommendations that will
12 facilitate the identification of successful pro-poor conservation interventions and the conditions
13 under which they work. Adoption of these recommendations will ensure pro-poor conservation is
14 built on clear definitions and engages in meaningful participation with rigorous monitoring and
15 reporting of outcomes, aiding replication and scaling-up of pro-poor conservation successes in
16 intelligent and evidence-based ways.

1 **1. Introduction**

2 The current decline in biodiversity is of great concern, not only for the loss of its intrinsic value and
3 the unknown impacts on ecosystem functioning, but also for the potential negative repercussions
4 for human well-being (Cardinale *et al.*, 2012, Reich *et al.*, 2012). Addressing biodiversity loss and
5 poverty are international societal and political goals (Sachs *et al.*, 2009, Roe, 2010). Each year the
6 world spends around US\$126 billion of official aid tackling global poverty and between US\$8-12
7 billion on addressing biodiversity loss (Roe *et al.*, 2011), yet in neither case are these resources
8 considered sufficient to solve these challenges (Roe *et al.*, 2011, Evans *et al.*, 2012). The majority of
9 the world's poor live in rural areas (IFAD, 2010) where they depend disproportionately on
10 biodiversity for their survival (Belcher, 2013). This relationship has led to the explicit assumption that
11 conserving biodiversity can help address global poverty, and in light of pressing challenges, such as
12 population growth, overconsumption and climate change, there is a strong need for further
13 integration of the poverty alleviation and biodiversity conservation agendas (Sachs *et al.*, 2009).

14 The integration of these agendas has so far proved more difficult and more expensive than
15 many had hoped (Adams, 2013). Conservation activities first started to address development issues
16 in the 1970s, motivated by the substantial negative impacts on local people borne from earlier
17 'fortress' conservation activities (Adams *et al.*, 2004). This 'people-friendly' approach, broadly
18 termed Integrated Conservation and Development Projects (ICDPs) (Blomley *et al.*, 2010), initially
19 attracted substantial support from international development agencies and conservation NGOs, and
20 was rather hurriedly seen as a panacea for conservation and sustainable development. However,
21 early results proved disappointing and the approach rapidly fell out of favour (McShane *et al.*, 2011,
22 Miller *et al.*, 2011). The ICDP label is now less common, but biodiversity conservation and poverty
23 reduction continue to be addressed as dual goals; the extent to which largely depends on the
24 perceived role of poverty in determining the status and threats to the intended conservation target
25 (Sandbrook and Roe, 2013). Adams *et al.* (2004) proposed a typology of four positions
26 conservationists may take to the question of poverty: 1) poverty and conservation are separate

1 policy realms; 2) poverty is a critical constraint on conservation, meaning it must be tackled to
2 achieve conservation goals; 3) conservation activities must not compromise poverty reduction, and
3 4) poverty reduction is a goal, dependent on resource conservation. Recognising these fundamental
4 differences in value positions can help contextualise the projects rationale, objectives and behaviour
5 of different actors, particularly when faced with difficult trade-off decisions between conservation
6 and development goals (Leader-Williams *et al.*, 2011). Truly addressing the dual goals of biodiversity
7 conservation and poverty reduction requires adopting the fourth position detailed by Adams and
8 colleagues (2004); an approach known as “pro-poor conservation”, and defined as ‘a people-centred
9 approach that has poverty reduction and livelihood security as core objectives and seeks robust
10 conservation approaches to achieve these’ (adapted from: Roe *et al.*, 2003, Roe and Elliott, 2006,
11 Kaimowitz and Sheil, 2007). It builds on the poor’s priorities and capabilities, effectively engages all
12 stakeholders in addressing the underlying policy and institutional drivers of environmental
13 degradation and empowers vulnerable groups with the assets, rights, and entitlements they need to
14 improve their lives through sound environmental management (Hazlewood *et al.*, 2004). Pro-poor
15 conservation can take a number of different forms and encompass a variety of approaches,
16 including: community-based conservation initiatives, direct payments (REDD+), and locally managed
17 protected areas.

18 Despite biodiversity conservation and poverty reduction being addressed as linked
19 challenges for a number of years, there is growing concern over the lack of empirical evidence for
20 these endeavours (Barrett *et al.*, 2011). An extensive review by Leisher *et al.* (2013b), although
21 constrained by the limited number of studies with robust evidence of poverty impacts, was able to
22 highlight ten conservation interventions that had contributed to poverty reduction. However, this
23 review also found that only four of these ten initiatives benefitted the poorest (see Table 1 and
24 Leisher *et al.*, 2013b for further details). Despite the dearth of empirical evidence for success, there
25 is still broad consensus among conservation professionals that there is a positive link between
26 biodiversity conservation and poverty reduction (Roe *et al.*, 2012). However, without empirical

1 evidence, pro-poor conservation risks basing decisions on belief rather than evidence, repeating
2 mistakes, and missing opportunities to replicate successes (Pullin *et al.*, 2013).

3 In this review, we synthesise the latest literature from the conservation, development and
4 interdisciplinary realms. Our aim is not to add to the debate on whether conservation can contribute
5 to poverty reduction, which distracts from the real task of improving the effectiveness of
6 conservation-poverty integration (see Roe *et al.*, 2012), but rather to take the issue back to basics
7 and evaluate reasons for the lack of evidence for success. Through this review we hope to clarify key
8 terms and concepts and provide recommendations to move pro-poor conservation forward.

9

10 **2. Ambiguous use of definitions**

11 Key concepts are often not explicitly defined in pro-poor conservation efforts (Caizhen, 2010, Roe,
12 2010, Roe *et al.*, 2013), leading to vague objectives and preventing data aggregation and comparison
13 (Kapos *et al.*, 2008). Poor or narrow definitions are the root cause of limited empirical evidence in
14 pro-poor conservation: how a concept is defined determines what is measured, and what is chosen
15 to be measured determines how success is defined (Leisher *et al.*, 2013a).

16 **2.1 Poverty**

17 Our understanding of poverty has evolved considerably from its original definitions, which focused
18 on a lack of income or wealth (Sen, 1993, Roe, 2010). It is now viewed as a multi-dimensional
19 concept, encompassing material deprivation, the lack of access to basic needs such as education,
20 health, nutrition and food security, the absence of political autonomy and empowerment, as well as
21 the lack of freedom of choice and social inequality (Chambers, 1995, Shackleton *et al.*, 2008,
22 Sunderlin *et al.*, 2008). Interest in multidimensional poverty measurement has been growing steadily
23 over the last decade (Alkire and Foster, 2011, Ravallion, 2011, Ferreira and Lugo, 2012) and
24 mainstream poverty research has become more sophisticated in its handling of this concept, both
25 through a diversification of methods, as well as by more inclusive processes of assessment that
26 include the perspectives of the poor (Addison *et al.*, 2009).

1 While the set of deprivations to be measured will vary depending on the social context,
2 example indicators can include: school attendance, access to safe drinking water, ownership of
3 durable assets and nutrition (Alkire and Foster, 2011). Patterns of associations across multiple
4 dimensions of poverty can be explored through simple tabulations, Venn diagrams or stochastic
5 dominance analysis (Ferreira and Lugo, 2012); they can also be aggregated into indices, such as the
6 Multidimensional Poverty Index (Alkire and Foster, 2011) or the Human Poverty Index (Dhillon and
7 Kaur, 2010). Poverty can be defined in either relative or absolute terms. Absolute terms measure
8 poverty in relation to the amount of money necessary to meet basic needs, whereas relative poverty
9 is defined in relation to the prevailing standards of living of other members of the society (Scheidel,
10 2013). The decision whether to use absolute or relative poverty is ultimately a value judgement
11 dependent on the main purpose for which the poverty measure is to be used. Where the relative
12 definition is taken it is important to find a locally appropriate understanding of a certain social group
13 or context (Scheidel, 2013). In either case, the chosen dimensions across which poverty has been
14 defined and measured must be explicitly stated, as conceptual and methodological differences in
15 defining poverty can lead to the identification of different individuals and groups as poor (Caizhen,
16 2010).

17 Although reports of pro-poor conservation studies discuss poverty as a multidimensional
18 concept this is not translated into how poverty is measured, which remains confined to narrow
19 income indicators (Leisher *et al.*, 2013b, Scheidel, 2013). This is despite income being known as an
20 insufficient indicator of poverty reduction in isolation and having a low rank among the items by
21 which the poor define their wellbeing (Chambers, 1995, Brandolini *et al.*, 2010, Ferreira and Lugo,
22 2012). Furthermore, poverty reduction in the income-poverty sense, does not capture the
23 complexity of livelihood and well-being-related objectives from local points of view (Berkes, 2013)
24 and these simplistic definitions of poverty have misdirected conservationists regarding the question
25 of community wants and needs, leading to narrowly conceived conservation benefits and incentives
26 for local people (Murphree, 2009, Berkes, 2013).

1 The dispersion of a distribution of income, consumption or other welfare indicator, (or its
2 inequality), is also an important dimension that is largely ignored. Inequality is moving to the
3 forefront of the development policy agenda, in recognition of its relationship to poverty and poverty
4 reduction (Melamed, 2012): inequality directly determines the rate of poverty reduction, and certain
5 types of inequalities (e.g. access to health care, education or markets, or civil and political rights)
6 have a direct causal effect on poverty (Jones, 2009). Equity has largely been addressed indirectly in
7 pro-poor conservation through the implicit assumption about spreading the costs or benefits, or as a
8 secondary concern, as with post hoc comparisons of the equity of outcomes (White *et al.*, 2012).
9 Pro-poor conservation would benefit from a focus on inequality as this would provide an incentive to
10 focus on those groups which are left behind.

11 **2.2 Biodiversity**

12 Biodiversity is defined by the Convention on Biological Diversity as “the variability among living
13 organisms from all sources including diversity within species, between species and of ecosystems”
14 (CBD, 1992). However, biodiversity is often used to refer to the amount, in terms of species and
15 populations, or to specific elements of biodiversity rather than variety *per se* (Roe *et al.*, 2013).
16 Biodiversity, like poverty, is a fundamentally multidimensional concept (Lyashevskaya and Farnsworth,
17 2012): it can be measured in terms of different components (genetic, population/species, and
18 community/ecosystem; see Table 2). Each of these components has compositional, structural and
19 functional attributes which can be considered the three-dimensions of biodiversity (Lyashevskaya and
20 Farnsworth, 2012). This means that no single level of organisation (e.g. gene, population,
21 community) is fundamental, and different levels of resolution are appropriate for different questions
22 (Noss, 1990).

23 Due to the sheer number of species and the difficulty of sampling many ecosystems,
24 measurements need to be simplified into tractable, quantifiable units that can be compared across
25 time and space (Bradshaw and Brook, 2010). Organism-based metrics that count the number of
26 distinct species in a defined area (species richness) are the most common (Bradshaw and Brook,

1 2010). However, species richness is arguably a narrow and poor estimate of biodiversity (Lyashevskaya
2 and Farnsworth, 2012). Metrics that accommodate a broader definition of biodiversity have been
3 developed (summarised in Williams, 2004), and there is a growing recognition of the functional,
4 phylogenetic and taxonomic aspects of biodiversity in conservation biology (Lopez-Osorio and
5 Miranda-Esquivel, 2010, Mouchet *et al.*, 2010, Strecker *et al.*, 2011).

6 There are two main problems with the use of the term “biodiversity” in pro-poor
7 conservation. Firstly, where biodiversity has been defined, it is typically measured using a narrow
8 perspective such as species richness, or a proxy that does not include any ecological information,
9 such as perceptions of change in animal populations or attitudes towards conservation (Agrawal and
10 Redford, 2006). Broader approaches to defining and measuring biodiversity have yet to be
11 incorporated into pro-poor conservation efforts. Conservation measures that aim to enhance a
12 specific attribute or component of biodiversity may have unanticipated effects on other measures of
13 biodiversity; multiple measures targeting specific combinations of attributes and components of
14 biodiversity are therefore needed (Agrawal and Redford, 2006). Secondly, the components used to
15 frame biodiversity are often not clarified, rendering the collected data meaningless. Knowing the
16 biodiversity (however measured) of one place, group or time is not useful in itself; it is the
17 comparable measurements of biodiversity from multiple places, groups or times that can be used to
18 answer crucial questions about how we might best act to conserve it (Purvis and Hector, 2000).

19

20 **3. Inappropriate monitoring:**

21 Another reason for the lack of evidence for success for pro-poor conservation is the lack of
22 monitoring and inconsistent reporting of outputs or outcomes. Continual and independent
23 evaluation of conservation interventions is a prerequisite to ensuring that conservation is
24 appropriately targeted and effective (Saterson *et al.*, 2004, Sutherland *et al.*, 2004), in addition to
25 ensuring that conservation fulfils its ethical responsibility to do no harm (Barrett *et al.*, 2011). But as
26 with mainstream conservation, pro-poor conservation initiatives have struggled with designing

1 appropriate methods for monitoring and evaluating project progress and outcomes (Blom *et al.*,
2 2010). This lack of evaluation has restricted opportunities to learn and improve pro-poor
3 conservation through adaptive management (Saterson *et al.*, 2004).

4 Successful pro-poor conservation strategies occur across a variety of dimensions, including
5 attitudinal, behavioural, economic and ecological (Wamukota *et al.*, 2012). Data that cover only one
6 or two of these dimensions have limited analytical value and can overlook trade-offs between
7 outcomes (Daw *et al.*, 2011, Brooks *et al.*, 2012). For example, an extractive reserve may be
8 considered a success by an economist based on increased income for local inhabitants, but a failure
9 by an ecologist and an anthropologist based on critical population decline within the ecosystem and
10 an absence of changed community values regarding conservation (Waylen *et al.*, 2010, Brooks *et al.*,
11 2012). Consequently, in order to effectively determine success of a pro-poor conservation strategy,
12 measures are needed across the distinct dimensions, as defined by the expected outcomes
13 (Wamukota *et al.*, 2012). Furthermore, monitoring data for pro-poor conservation initiatives is rarely
14 disaggregated for the poorest (or by ethnicity, gender, religion etc.), yet this would facilitate explicit
15 assessment of how equity influences the ability to achieve project outcomes and produce a more
16 nuanced picture of the intervention impacts on different groups (Halpern *et al.*, 2013). Inappropriate
17 monitoring can be attributed to four key problems: ambiguous definitions, donor pressures, lack of
18 understanding between traditional scientific disciplines and lack of adequate reporting.

19 **3.1 Ambiguous definitions:** the use of ambiguous definitions cascades to vague objectives and
20 difficulty in developing targets and indicators to gauge performance. Objectives of conservation
21 projects are often not clearly stated or linked directly to individual actions that might be monitored
22 later (Bottrill *et al.*, 2011). For example, community-level development activities, such as alternative
23 livelihoods, are often emphasised as an indirect step toward effective long-term biodiversity
24 conservation, but when the link between the activities and the aim are vague, projects tend to focus
25 on ticking off activities, as opposed to monitoring the impacts of these activities (Sayer and Wells,

1 2004). What, where and how to monitor, follows logically from clear and unambiguous objectives
2 and questions (Lindenmayer *et al.*, 2012).

3 **3.2 Donor pressures:** effective monitoring is compromised through the influence of donors'
4 demands and priorities (Bottrill *et al.*, 2011) in three main ways. Firstly, there is a mismatch in the
5 short time frame of funding and the long time frame needed to evaluate socioeconomic and
6 ecosystem impacts, which often take longer than the funding period to undergo detectable change
7 (Barrett *et al.*, 2011, Pullin *et al.*, 2013). Secondly, projects are influenced by donor priorities and
8 emphasize particular kinds of objectives over others, with the objectives that are less attractive to
9 funders left unstated or poorly articulated (Pullin *et al.*, 2013). Pro-poor conservation projects have
10 multiple objectives, and as a result the total monitoring can be a major drain on finite resources,
11 with managers often reluctant to divert scarce resources from action to monitoring (Gardner, 2012).
12 In addition, the inarticulation of all objectives in the funding proposal means there are often
13 inadequate funds available for monitoring the full range of outcomes (Kapos *et al.*, 2008). Thirdly,
14 neither donors (nor conservation organisations) have created a culture in which monitoring of
15 outcomes is seen as desirable in its own right (Kapos *et al.*, 2008). Both individual and institutional
16 concerns about exposing shortcomings have served as a strong disincentive for critical evaluation. In
17 some cases there is also an insidious disincentive for claiming or demonstrating success in that
18 perceived improvements may reduce the case for public, political and/or financial support (Pullin *et*
19 *al.*, 2013). However, Kapos *et al.* (2008) suggest that the capacity for rigorous analysis and synthesis
20 should provide a strong incentive for evaluation to donors and practitioners alike.

21 **3.3. Limited understanding between traditional scientific disciplines:** monitoring is further
22 compromised through a lack of understanding of social science research by natural scientists who
23 often lead pro-poor conservation efforts (Lélé and Norgaard, 2005). The collection of social data,
24 such as people's behaviours or perceptions of change has followed natural scientists' affinity for
25 quantitative data and large sample sizes that allow statistical analyses and broad generalisations
26 (Drury *et al.*, 2011). But poor understanding of the aims and scope of qualitative methods can lead

1 to the false assumption that social data can be collected in a straightforward manner and
2 interpreted at face value, leading to misinterpretation of the results (Adams, 2007, Homewood,
3 2013). Natural science research approaches cannot simply be extended to the social science domain,
4 as paradoxically an emphasis on quantification of social data may compromise data quality and
5 validity (Adams, 2007, Drury *et al.*, 2011).

6 Ineffective application of social science research methods has also limited monitoring value
7 due to a lack of meaningful participation. Given the range of different dimensions that need to be
8 considered and in order to ensure data quality, the dimensions on which monitoring should focus
9 should be defined by local people's priorities and local interest in contributing to and making use of
10 the results (Homewood, 2013). Participation included in pro-poor conservation is rarely meaningful
11 and in extreme cases can verge on coercive (Naughton-Treves, 2012). Therefore what sets out to be
12 a people-centred approach, in reality may only 'involve' local communities as recipients of
13 concessions and development assistance (Lele *et al.*, 2010). This ineffective application of social
14 science research methods is ultimately detrimental to what pro-poor conservation sets out to
15 achieve (McShane and Wells, 2004). Successful initiatives require community objectives to be taken
16 seriously and empowerment of all community members (Murphree, 2009). Better application of
17 social-science principles would help achieve this through developing an understanding of local
18 aspirations, refraining from manipulating communities and thinking about trade-offs (Berkes, 2013).

19 **3.4 Lack of reporting:** many project implementers still do not report outputs or outcomes
20 consistently, and consequently there have been few quantitative comparative evaluations (Waylen
21 *et al.*, 2010, Brooks *et al.*, 2012). There is also a potential publication and reporting bias, with
22 unsuccessful cases or metrics less likely to be published (Wamukota *et al.*, 2012). This makes true
23 comparative studies and analyses difficult, and strongly limits any attempt to describe relationships
24 between poverty reduction and biodiversity conservation.

1

2 **4. Focussing on the details: seeing the trees in the wood**

3 Success in pro-poor conservation actions cannot be expected while these fundamental flaws persist,
4 and we believe addressing these flaws must now become a priority. We propose five key
5 recommendations to facilitate the collection of an evidence base that will enable the success of pro-
6 poor conservation strategies to be determined (summarised in Table 3):

7 **1. Unequivocal definitions of key terms.** Poverty and biodiversity need a multi-dimensional
8 approach to their definition and measurement, and therefore success also needs to be measured
9 across a variety of dimensions. This will lead to more nuanced questions, such as which groups of
10 the differentiated poor depend on which elements of biodiversity (Roe, 2010, Daw *et al.*, 2011).
11 Poverty, biodiversity and success are context-specific and the dimensions that have been used to
12 classify them need to be clearly stated, alongside additional contextual conditions that can influence
13 success, such as number of communities, size of population, level of dependence on biodiversity and
14 local governance (Waylen *et al.*, 2009, Wamukota *et al.*, 2012). Baseline data also forms part of the
15 context and should be collected at the start of the project to provide a benchmark for comparison
16 with data collected through monitoring of subsequent activities (Bottrill *et al.*, 2011). Further work is
17 required on developing and using standard multidimensional measures of biodiversity as the norm,
18 rather than the exception. Species richness has been shown to be a poor surrogate for biodiversity
19 and consequently an urgent goal is to catalogue species with their significant functional traits in
20 accessible databases to enable field-collected species lists to serve as a key to estimating biodiversity
21 in its fuller meaning (Lyashevskaya and Farnsworth, 2012).

22 **2. Rigorous monitoring that is efficient and appropriate for purpose.** This follows naturally from a
23 thorough understanding of all the dimensions that need to be measured for poverty and
24 biodiversity. A monitoring programme must be designed to be sensitive enough to detect
25 incremental changes and capture the full range of potential outcomes across different dimensions
26 (attitudes, behaviour, ecological and economic; see Margoluis *et al.*, 2009). Appropriate monitoring

1 data will reveal opportunities to learn and develop more responsible management practices
2 (Gardner, 2012). Appropriate monitoring also requires local inputs; equitable participation of all
3 stakeholders is considered central to the adaptive management processes and ultimately leads to
4 better results and sustainability (Jacobson *et al.*, 2009).

5 Monitoring data should be both qualitative and quantitative, and collected on different
6 levels and scales (e.g. individual, household, and community), as multilevel analyses are critical to
7 understanding the dynamics at the different scales that can affect project outcomes (Brooks *et al.*,
8 2012). Pro-poor conservation efforts should collect data in as disaggregated form as possible to
9 facilitate analyses of inequalities and ensure the poorest and most vulnerable are not being left
10 behind. Aggregated data can mask inequalities (UN Task Force, 2012) whereas differentiated
11 analyses (e.g. by gender, ethnicity, livelihoods and socioeconomic status, see Daw *et al.*, 2011) can
12 facilitate achieving conservation outcomes (Halpern *et al.*, 2013) by elucidating the conditions where
13 significant trade-offs are likely to occur (e.g. between the well-being of different people, either
14 between or within communities, or between different outcomes, such as income and food security;
15 Daw *et al.*, 2011).

16 Since project outcomes may not be achieved over the small timescale of the project, indices
17 based on outputs will always be needed (Jones, 2012). Assessing the degree to which intermediate
18 outcomes have been achieved can support adaptive management and provide insights on likely
19 long-term effectiveness of interventions (Kapos *et al.*, 2008, Pullin *et al.*, 2013). For this to be
20 effective, how the delivery of outputs is linked to outcomes needs careful consideration (see
21 planning protocol in: Conservation Measures Partnership, 2013). Jones (2012) suggests that for
22 output measures to be more valuable for assessing project success, the linkages between outputs
23 and outcomes, both in project proposals and reports, alongside the evidence upon which the
24 assumption is based, should be explicitly stated (Jones, 2012).

25 **3. Long-term approach for sustainability.** Pro-poor conservation efforts need to be based on long-
26 term commitment, reflecting the time needed to make the project work (Blom *et al.*, 2010). This will

1 require a level of institutional change among organizations and agencies responsible for funding pro-
2 poor conservation, through 1) providing more long-term and flexible funding; 2) incentivizing and
3 promoting a culture of adaptive management and prospective ventures in trial and error (Bottrill *et*
4 *al.*, 2011), and; 3) being open to funding 'less attractive' projects that address the needs and threats
5 to the poor and which are not built from pre-determined external viewpoints (Kaimowitz and Sheil,
6 2007).

7 Poverty reduction can occur through improved governance and strengthening of local
8 institutions and therefore for long-term sustainability, pro-poor conservation needs to emphasize
9 community engagement, institution building and the devolution of authority and responsibility to
10 local people (Belcher, 2013). Possibilities and mechanisms for exit (or sustainability) strategy may
11 only become clear after a number of years of successful implementation, although it should be
12 considered in the planning stage, with possible revisions based on achievements during the
13 programme (Young, 2008).

14 **4. Greater awareness and correct application of social-science research methods.** This could be
15 achieved through collaborations across the social and natural sciences. This would improve pro-poor
16 conservation through: 1) the adoption of meaningful participation (for further details see Burns *et*
17 *al.*, 2004)); 2) the facilitation of qualitative approaches that complement quantitative methods
18 through acknowledging the limitations of different research methods in a social and cultural context
19 (Drury *et al.*, 2011), and; 3) improved understanding of local level processes and outcomes,
20 particularly with regard to the complex formal and informal governance of common-pool resources.
21 Use of common-pool resources is structured through institutions ("the sets of formal and informal
22 rules and norms that shape interactions of humans with others and nature"; Agrawal and Gibson,
23 1999); an analysis of these institutions could offer insights for developing appropriate pro-poor
24 conservation activities, and could be achieved through the Institutional Analysis and Development
25 framework (see Imperial and Yandle, 2005, Ostrom, 2007, Ostrom, 2009). This would lead to the

1 recognition of factors that can influence pro-poor conservation outcomes at the local level, including
2 power relations and inherent biases of different actors in the research process (Drury *et al.*, 2011).

3 Likewise, greater collaboration across the social and natural sciences would benefit poverty
4 reduction development initiatives, which often result in biodiversity loss (e.g. oil palm versus old
5 growth forests, dams and downstream impacts) and are generally based on unsustainable patterns
6 of consumption and resource use (see Adams, 2013). Greater collaboration between disciplines
7 would facilitate appropriate evaluation of biological and social outcomes, through mitigation of
8 different languages and concepts between natural and social sciences (Ostrom, 2009).

9 **5. Systematic reporting of outcomes (whether successful or not).** This will facilitate identification of
10 effective interventions and the conditions under which they work more consistently, aiding
11 replication and scaling-up of these successes in intelligent and evidence-based ways (Rands *et al.*,
12 2010). Inevitably, there will be trade-offs in pro-poor conservation, but an open and integrative
13 approach to acknowledging the trade-offs incurred by various choices and actions will provide
14 insight and opportunity for genuine reflection, honest communication, and responsible action
15 (Hirsch *et al.*, 2011). Meaningful participation and multidimensional measurement of outcomes will
16 help assess potential trade-offs, which should be assessed amongst all outcomes, and could lead to
17 more resilient and sustainable conservation outcomes (McShane *et al.*, 2011). To ensure the poor
18 are benefitting from overall progress, data for the poorest groups should be measured and reported
19 separately (Melamed, 2012). While scientific publications and making data freely available are
20 important for the wider scientific community, regular feedback of findings to stakeholders is also
21 essential; it reaffirms that their involvement is being acted on in a transparent manner and also
22 fosters social learning (Williams, 2011).

23 **5. Conclusion**

24 In this review, we have brought together literature from across the natural, social and
25 interdisciplinary domains to assess why there is a lack of evidence for success in pro-poor
26 conservation. This paper demonstrates that success is being compromised in pro-poor conservation

1 through a lack of attention to fundamental details in defining key terms and inappropriate
2 monitoring. We propose recommendations that will improve pro-poor conservation through
3 building upon clear definitions and engaging in meaningful participation with rigorous monitoring
4 and reporting of outcomes. Much has been learnt about the failure of ICDPs, but mistakes continue
5 to be repeated, and we are certainly not the first to call for rigorous, systematic monitoring in
6 conservation (e.g. Blom *et al.*, 2010, Bottrill *et al.*, 2011, Jones, 2012). This highlights a disconnect
7 between research and practice that urgently needs to be resolved leading to a culture of effective,
8 rather than simply well-intentioned, conservation practice (Pullin *et al.*, 2013).

9 Given that the challenges facing biodiversity and inequality worldwide show no signs of
10 diminishing; the rationale for addressing biodiversity conservation and poverty reduction together is
11 ever more important. In order to increase funding for conservation activities and to encourage
12 donor confidence in conservation investments; there needs to be considerably more attention
13 devoted to developing and applying robust and cost-effective approaches for evaluating success
14 (Jones, 2012). Conservation is currently marginal to the Millennium Development Goals, but building
15 an empirical evidence base for pro-poor conservation could help influence the development of the
16 post-2015 development goals and help development and conservation become more mutually
17 supportive at both international and national levels.

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- 1 Table 1. Summary of conservation interventions shown to provide poverty reduction benefits, and
- 2 those which benefited the poorest (Adapted from Leisher *et al.* 2013).

| Intervention | Number of studies | Benefits the poorest? |
|---|-------------------|-----------------------|
| Commercialisation of non-timber forest products | >50 | Yes |
| Community forestry | >50 | Yes |
| Payments for ecosystem services | 10-50 | |
| Nature based tourism | 10-50 | |
| Locally managed marine areas | 10-50 | Yes |
| Mangrove conservation | 10-50 | Yes |
| Protected area jobs | <10 | |
| Agroforestry | 10-50 | |
| Grasslands | <10 | |
| Agro-biodiversity | <10 | |

3

4

- 1 Table 2. Indicators of Attributes and Components of Biodiversity with a focus on measures that
- 2 would be most useful in determining potential effects of human use on biodiversity (Agrawal and
- 3 Redford, 2006).

| Attributes / Components | Composition | Structure | Function |
|-------------------------|--|---|--|
| Genetic | Allelic diversity | Heterozygosity Heritability | Gene flow Genetic drift Mutation rate Selection intensity |
| Population/ Species | Species abundance Biomass Density | Population structure, dispersion, and range | Fertility, Mortality, Survivorship, Life history Phenology |
| Community/ Ecosystem | Relative abundance of guilds or life forms, proportions of exotic or endemic species | Spatial geometry and arrangement of patch types | Disturbance regimes, Nutrient & energy flows, biomass productivity, patch dynamics |

4

5

- 1 Table 3. Current flaws for evaluating pro-poor conservation and proposed solutions (see main text
- 2 for details)

| Problem | Solution |
|--|---|
| Ambiguous definitions | Unequivocal definitions of key terms (e.g. poverty and biodiversity) (Roe, 2010) |
| Inappropriate monitoring | Rigorous monitoring that is efficient and appropriate for purpose (Kapos <i>et al.</i> , 2008) Disaggregated data (Daw <i>et al.</i> , 2011) |
| Donor pressures | Long-term approach for sustainability Fundamental shift in donor funding (long-term, flexibility etc.) (Bottrill <i>et al.</i> , 2011) |
| Limited understanding between traditional scientific disciplines | Greater awareness and correct application of social-science principles (Drury <i>et al.</i> , 2011) |
| Lack of reporting/communication | Systematic reporting of outcomes (whether successful or not) (Hirsch <i>et al.</i> , 2011) Progress for the poorest groups reported separately (Melamed, 2012) |

3