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Assessing community reforestation projects for biodiversity improvement and poverty alleviation

Abstract

Biodiversity loss through deforestation and poverty are major global issues and their combined mitigation has become an important political objective. Integrated conservation and development projects (ICDP) like community-based reforestation projects aim to both conserve biodiversity and alleviate poverty. It is debatable, however, whether ICDP, and in particular community-based reforestation projects, achieve this effectively and systematic assessment of multiple studies using a common organisational framework is still missing. The Conservation Excellence Model (CEM) allows analysis of the linkage between biodiversity management, community interventions, and their influence on both community outcomes and biodiversity improvements, so could be a suitable framework for ICDP. CEM assessment provides field-based evidence from multiple and balanced perspectives and an understanding of organisational processes to inform understanding of ICDP effectiveness. This review calls for CEM assessment and comparison of community-based reforestation projects in areas that are biodiversity hotspots and also characterised by high levels of rural poverty. There is a strong argument that the assessment of such community-based reforestation projects would provide a globally-relevant model for effective ICDPs and give insight into effective practices.

Keywords: ecological restoration, community-based reforestation, rural development, biodiversity conservation, performance evaluation, conservation excellence model

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Introduction

Biodiversity is declining rapidly with rates 1,000 to 10,000 higher than natural background extinction[1] One of the main driving factors is the ongoing deforestation through agricultural land conversion.[2,3] Approximately 30 percent of the world's natural forests are expected to be lost by the end of this century[4] and the tropics are amongst the regions that suffer the most devastating forest loss. Almost 1.1 million km^2 of tropical forests were lost over the period of 2000 to 2012 and rates are steadily increasing.[5] This poses a major threat to a large part of the world's biodiversity and to human livelihoods and well-being since forests provide ecosystem services such as carbon sequestration, climate change mitigation, ecosystem regulation, water retention, prevention of soil erosion and soil fertility.[6]

More than 767 million people live below the international poverty line of $1.90 a day[7] and using the multidimensional poverty index (MPI) this number rises to 1.45 billion people.[8] Communities with high levels of poverty often occupy regions of high biodiversity[9,10] and are dependent on forest resources to satisfy their subsistence needs in times of economic shock and crisis.[11] Conflicts may arise, if rural communities overexploit forest resources and convert forests to agricultural land,[11] so biodiversity loss through deforestation and rural poverty are major global issues where combined mitigation has become an important political objective.[10,12]

Integrated conservation and development projects (ICDP) like community-based reforestation projects have the potential to protect biodiversity and alleviate poverty.[13] However, success is not guaranteed and many ICDP fail to deliver either social or environmental aims.[14] Therefore, it is necessary to understand what practices make ICDPs effective and how these practices can be promoted. To achieve this a suitable assessment framework needs to be identified that improves the understanding of the linkage between biodiversity management, community interventions, and their influence on both community outcomes and biodiversity improvements.[15]

This review first explores the potential of linking reforestation with rural development in so called community-based reforestation approach and then draws general conclusions from previous ICDP projects. Afterwards an organisational evaluation model is examined, which can be best applied to biodiversity conservation and poverty alleviation programmes across a wide geographic, cultural and environmental scope. Last but not least this review calls for research that is able to assess pro-poor community-based reforestation initiatives in biodiversity hotspots and allows meaningful comparisons with other ICDPs to enable the identification and promotion of effective practices.

Defining poverty and poverty alleviation

Poverty is a multidimensional concept, which encompasses economic, environmental, political, social and cultural factors.[16] Poverty can manifest not only through a lack of income or food but also through a lack of access to health and education, a lack of autonomy and political responsibility, a lack of equality and empowerment and a lack of freedom and opportunity.[17] Poverty alleviation brings people closer to the poverty line but does not transform them from poor to non-poor because it addresses some but not all dimensions of poverty.[10] It is often argued that biodiversity conservation can help to alleviate poverty because high levels of biodiversity often coincide with rural poverty and the rural poor often heavily depend on biodiversity for income generation and risk protection.[18] Such conservation development initiatives often focus on

increasing income and diversifying livelihoods of rural people.[16] This, however, only addresses one dimension of the poverty concept and in most cases, motivations in rural communities comprise both social well-being alongside economic benefits.[19] It is therefore essential for conservation development initiatives to dissociate from a purely economic focus to the problem and proceed to a broader strategy for successful poverty alleviation.[16]

Defining integrated conservation and development projects

Integrated conservation and development projects (ICDP) is a generic term for projects that combine conservation with rural development approaches.[20] The term is also specifically applied to a range of projects that were established in the 1990s.[21] The ICDP approach was justified with the concurrence of rural poverty and biodiversity loss,[22] on the presumption that effective and sustainable biodiversity conservation could only be achieved by alleviating poverty and provision of alternative livelihoods for local communities.[13,23] Nowadays the term ICDP is not necessarily used anymore[24] but there is a large body of literature on three broad categories of approach: community-based conservation (CBC), community-based natural resource management (CBNRM) or community-based forest management (CBFM). A common feature of these approaches is that they integrate components of conservation and development through focusing on local community engagement, promoting sustainable natural resource management and increasing socioeconomic benefits.[25] This review will hereafter use the generic term ICDP to cover all these three approaches for the purposes of compiling previous relevant research.

Potential for linking reforestation and rural development

The conflict between the dependency of rural poor on forest resources and the increasing deforestation caused by anthropogenic pressures[11] might suggest opportunities for identifying mutually beneficial interventions such as reforestation through agroforestry.

Reforestation impacts on biodiversity

In response to the rapid progression of deforestation large-scale ecosystem restoration and reforestation was announced as a major global priority during the 11th Conference of the Parties held by the Convention on Biological Diversity.[26] The 2011 Bonn Challenge (setting a target of reforesting 150 million hectares by 2020) and the 2014 New York summit (350 million hectares by 2030) paved the way for ambitious reforestation projects.[27] As a result, planted forests are increasing these days although natural forests continue to decrease.[4] However, it is still debated to which degree the original biodiversity can be recovered. Although plantations in almost all cases contain less native biodiversity compared to natural forests.[4,28,29] Plantations often have higher species richness than degraded agricultural land.[30] Nevertheless, the conversion of natural forests to plantations should be avoided and the protection of natural habitat should remain a priority.[4] Alongside natural forest protection, restoring degraded agricultural landscapes by establishing planted forests provides some degree of additional biodiversity protection,[30] if implemented on landscape scale, primarily uses native tree species and the planted forests are structurally and species diverse with dense native understorey.[4,28] Pawson et al.,[31] demonstrated that plantations can still provide habitat to threatened species, reduce microclimate edge effects and increase the availability of forest habitat.

Reforestation impacts on people

Ecological restoration is likely to facilitate the provision of ecosystem services and create jobs, which potentially offers a win-win situation for biodiversity conservation and rural development.[6,32] Community-based reforestation is a type of ICDP that aims to restore degraded agricultural land and increase forest cover while simultaneously alleviating poverty. Win-win situations are especially prominent if community-based restoration is combined with agroforestry, payments for ecosystem services (PES) and/or ecotourism.

Agroforestry is an agricultural method, where forest trees are introduced to and intentionally managed with agricultural crops.[33,34] This method can significantly increase household income, improve microclimate, soil fertility, water retention and crop productivity and thereby alleviate poverty.[35,36] In Cameroon and Nigeria the domestication of indigenous fruit trees and the sale of agroforestry tree products (AFTP) produced sufficiently high revenue to lift farmer households above the poverty line and reduced hunger and malnutrition.[37] In the Sal forest in Bangladesh, a participatory agroforestry program successfully alleviated poverty and provides an example of how sustainable rural development can catalyse country-wide economic development.[35] Agroforestry also sustains biodiversity and ecosystem services by decreasing anthropogenic pressure on protected areas, increasing the connectivity of natural forests, providing habitat for species and reducing conversion to agricultural land.[33,38] Successful poverty alleviation from agroforestry is, however, only possible, if farmers possess land use rights, a market demand for the agroforestry product is present and access to local markets is ensured.[35,36] Furthermore, agroforestry is a double-edged sword because intensifying agroforestry has substantial short-term benefits but the conservation value and thereby the benefits of ecosystem services will decrease in the long run in intensively managed agroforests.[33,38]

Another potential win-win may arise from 'Payment for Ecosystem Services' schemes (PES) which involve voluntary transactions by service buyers paid to service providers to secure environmental services such as watershed protection, biodiversity conservation or carbon sequestration.[39] If implemented correctly, PES can help to mitigate the effects of multidimensional poverty by empowering communities, creating participatory environments, strengthening recognition of communities by the municipality and government and promoting social justice.[40] Prerequisites for these benefits, however, are that communities possess clear property rights, are organized, have established governance structures that foster collective actions and are motivated to use conservation for income generation.[41] PES tend to generate only moderate economic benefits and those benefits are hard to quantify because the financial gains from PES need to be set off against the financial losses from use-restriction or asset-building.[42] Moreover, it is still questionable whether PES truly benefits conservation, if leakage, the displacement of damaging anthropogenic activities, is taken into account.[43]

In addition to direct community benefits through reforestation and landscape recovery, other associated initiatives such as ecotourism, can contribute to conservation and sustainable development of local communities,[44] and offer potential to improve biodiversity conservation and rural livelihoods.[45,46] If designed correctly, ecotourism can be a tool to incentivize conservation of the environment, promote awareness and generate money for conservation projects.[45,47] Under the right conditions ecotourism can create employment opportunities

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for local communities for example through guiding, accommodation and sales of local crafts, food and drinks.[34,47] If local participation is strengthened and tourism operators commit to employ locals, ecotourism has the greatest potential to alleviate poverty.[10] However, more often than not ecotourism fails to deliver those benefits, because of unequal benefit distribution, benefit leakage, elite capture and mismanagement.[45,47] Additionally, benefits from resource extractions are often greater than those of ecotourism, which hinder successful implementation.[48] Moreover, ecotourism depends on prior investments in infrastructure, hotels and skill training,[49] which is oftentimes insufficiently provided.[45] At worst, too many tourists can damage the ecosystem and have contradictory effects on the environment.[50]

Overall, although community-based reforestation has great potential to conserve biodiversity and alleviate poverty, there is still substantial debate about the practicality and effectiveness of individual approaches. Furthermore, few studies have investigated the effectiveness of community-based reforestation programmes in particular, probably because this approach is quite new. More general conclusions can potentially be drawn from other types of ICDP.

Lessons from previous ICDP

Considerable debate surrounds discussion of ICDP in the literature,[51] Some praise ICDP as a powerful tool to link biodiversity conservation and poverty alleviation and increase local acceptance of conservation initiatives, others criticise ICDP for its failure to achieve core objectives.[14,52,53] This failure is often associated with the absence of clearly defined and measurable project goals,[22] the brevity of funding cycles, which do not allow enough time to successfully implement projects,[54] the absence of markets for products of alternative livelihoods,[35] the absence of monitoring and evaluation[51,54] and designing projects in a top-down fashion with only a minimal focus on local participation.[55] Another essential barrier to ICDP success can be national policies, which are not in favour of conservation and instead drive deforestation.[56] This is largely due to conservation on a national scale being outcompeted by the profits of large-scale logging, although conservation can be economically profitable on local scale.[57] ICDP has been seen to often fail to recognize the heterogeneity of local communities and their varying dependency on, and preference of, different forest resources.[52,58] ICDP also often favoured community members, who already have expertise and knowledge[59] leading to elite capture, low participation of less advantaged people, inequitable benefit distribution and subsequently further marginalization of the rural poor.[52,58–60] Those failures, however, offer the unique opportunity to learn and improve future community conservation projects.[61] Brooks et al.,[25] show that projects which engage local communities in project planning and management, respect local culture, traditions and leader, facilitate capacity building, enhance social capital, emphasize non-economic as well as economic benefits and their equitable distribution tend to be more successful. Furthermore, accepting trade-offs between conservation and development can help project success,[54] especially because conservation usually involves significant costs at the local scale at a local scale.[57] This suggests that compensating for those costs through the provision of visible and sustainable benefits for local communities such as education, skill training and health services can facilitate improved outcomes.[54]

Nevertheless, there is a significant lack of carefully collected field-based multidisciplinary comparative evidence[25,51] and most of the debate about ICDP effectiveness is still highly anecdotal and confrontational.[51,62] In order to facilitate an understanding of effective practices, systematic assessment of multiple studies using a common organisational framework over a wider geographic scope, which can inform conservation practitioners and facilitate their cooperation[63–65] is required.[25]

Relevance of the conservation excellence model to ICDP

Although community-based reforestation has great potential to conserve biodiversity and alleviate poverty, there is still substantial debate about the practicality and effectiveness of individual approaches. Only a few studies have investigated the effectiveness of community-based reforestation programmes. Furthermore, drawing general conclusions from other types of ICDPs is hard due to the lack of field-based, multidisciplinary and comparative evidence. One difficulty is aligning human socio-economic outcomes (income, well-being, engagement), sustainability and biodiversity outcomes (e.g. habitat recovery, species recovery, threat reduction) and incorporation of environmental, social, economic and political variables into any assessment.[65] A more holistic approach to programme evaluation is necessary. Furthermore, the very nature of the ICDP participatory concept, suggests that an effective programme evaluation requires an inclusive approach, which enables contribution of all stakeholders.[63]

The Conservation Excellence Model (CEM) was developed by Black & Groombridge[66] to encourage improved performance and effectiveness in conservation organisations. It offers an evaluation method based upon established organisation improvement practices[67] aligned with organisation theory.[68] CEM uses a system-thinking approach,[69] which remains relevant for users in a variety of cultural, social and environmental contexts to understand how results and approaches correlate and whether the programme's purpose can be achieved within its design, how people are involved and utilised, and the application of policy and activities.[68] The advantage of the CEM evaluation framework (Figure 1) is that it includes five "Approach" criteria (Leadership, People & Community Management, Policy & Strategy, Resource Management) and four "Results" criteria (People & Local Community Results, Biodiversity Results, Impact on Wider Society, Conservation Program Results) and the links between each.[66] This data is taken through observation of the programme and engagement of stakeholders involved in its activities. Assessments using this model address both the activities conducted by an organisation to achieve its aims and the actual outcomes resulting from these activities,[66] making it an excellent example of the type of evidence-based approach which has been repeatedly called for in the literature.[62,64,70]

The CEM assessment methodology involves collecting data from the organisation under assessment, reviewing that information against organisational principles and then scoring the performance effectiveness of the organisation on the basis of nine criteria.[66,71] Such scoring yields a standardized way of reading the results, which can be compared and benchmarked across organisations[71] leading to identification of best practices and facilitation of learning and improvement which is so needed in the biodiversity sector.[72] Indeed, some benchmarks of conservation performance involving reforestation projects are now starting to emerge.[71] The CEM therefore offers one of the best suited frameworks for assessment and benchmarking multiple studies across a wide geographic, cultural and environmental scope,[68] and should be the model of choice for assessing suitable ICDP projects.

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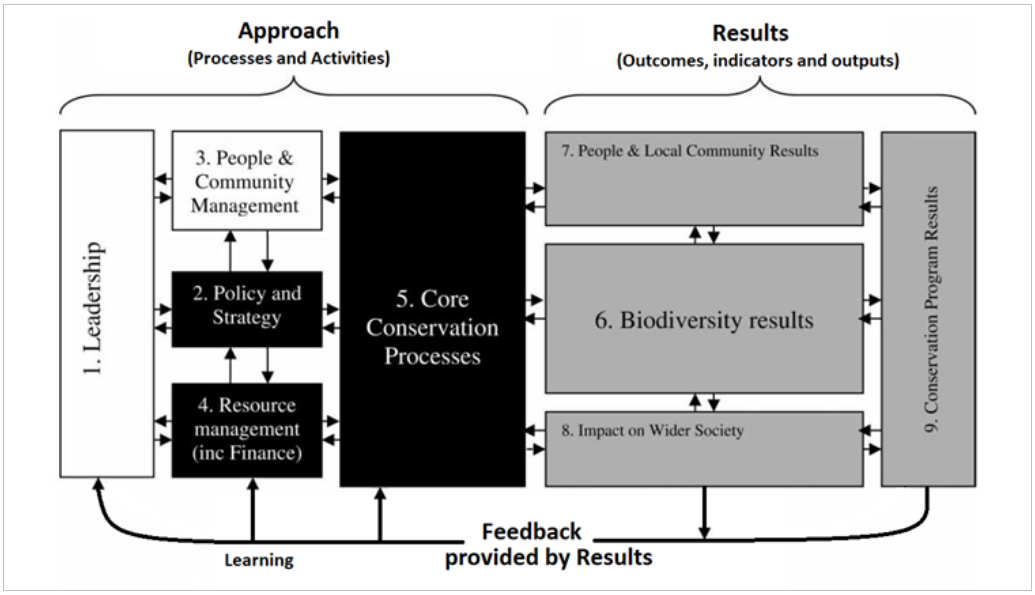

Figure 1 The Conservation Excellence Model.[66]

Conclusion

To date the debate surrounding ICDP effectiveness remains highly anecdotal and confrontational. In order to facilitate an understanding of effective practices, systematic assessment of multiple studies using a common organisational framework is needed, which can inform conservation practitioners and facilitate their cooperation. The CEM evaluation offers a method to investigate the links between organisational practices, specific conservation intervention work (including rural development) and the outcomes and impact achieved as a result and therefore appears well suited for assessment and comparison of multiple studies across a wide geographic, cultural and environmental scope.

This review calls for CEM assessment and comparison of community-based reforestation projects located in areas of high biodiversity threatened by anthropogenic pressures and which coincide with high levels of rural poverty. Case studies need to examine local communities' involvement in the mitigation of threats to biodiversity while simultaneously offering opportunities for poverty alleviation.

Research that is able to assess pro-poor community-based reforestation initiatives in biodiversity hotspots and potentially enable meaningful comparisons with other ICDP projects will provide the necessary field-based evidence. Assessments using multiple and balanced perspectives and a review of organisational processes will inform wider debate about community-based reforestation and ICDP effectiveness in general. Moreover, a holistic review of such interventions offers great potential for informing the global conservation and development community of how to develop impactful and beneficial conservation initiatives.

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Conflicts of interest

The author declares there are no conflicts of interest.

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