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## A Perspective on Conservation and Development

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24 **Abstract**

25 Since the industrial revolution, the predominant model of economic development has  
26 involved economies of scale and unsustainable exploitation of natural resources,  
27 leading to environmental degradation and the ongoing mass extinction of species. The  
28 environmental impacts of this development-for(the sake of)-development model led to  
29 biodiversity conservation efforts that can be described as conservation-for (the sake of)-  
30 conservation approach involving protected areas maintained free of humans. This approach  
31 subsequently expanded to include development-for-conservation efforts that integrated local  
32 community welfare into conservation programs. These conservation approaches helped make  
33 socio-ecological gains, but have failed to address planetary environmental degradation. Here, we  
34 outline a development approach for the earth’s last-remaining biodiversity rich areas, focusing  
35 on economies of value rather than scale, and relying on conservation of biodiversity and  
36 sustainable use of ecosystem services. This conservation-for-development model is an attempt  
37 to bring humanity and nature closer, and move away from nature–people dualism that has  
38 characterized economic development and biodiversity conservation so far.

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40 **Key words:** Biodiversity, economic development, ecosystem services, nature-based

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47 **1.1 Introduction**

48 The ongoing loss and conversion of vast stretches of natural habitats across the world's lands; the  
49 overexploitation of wild plants and animals on land and in the oceans; pollution, climate change, and the  
50 resultant degradation of ecosystem services have triggered a planetary environmental crisis and mass  
51 extinction of species (Dasgupta 2021). In the earlier mass extinctions, with the first one occurring between  
52 490 to 443 million years ago, the earth lost 50 to 95% of its extant species (Sodhi et al. 2009). In the next  
53 few years, 25% of the estimated species on the planet face extinction. The current extinction wave is  
54 particularly extraordinary, having been brought about by the actions of a single species, and, over a  
55 relatively short duration of two centuries (IPBES 2019).

56 These changes have been precipitated by the predominant model of development that prioritizes  
57 economic growth at the expense of the environment. To arrest these changes, there is an urgent need for  
58 an approach that can promote economic development while also conserving biodiversity. In this  
59 perspective piece, we lay out a potentially transformative development model, which we term as  
60 *conservation-for-development*. We believe that this approach could have positive human well-being and  
61 biodiversity outcomes. We first describe the three different approaches to development and conservation  
62 that have been followed since the industrial revolution: *development-for (the sake of)-development*,  
63 *conservation-for (the sake of)-conservation*, and *development-for-conservation*. We outline the primary  
64 goals of these approaches and the general impacts that they have had on human well-being and  
65 biodiversity conservation. Following this, we describe the *conservation-for-development* model, that  
66 would rely on the sustainable use of ecosystem services and conservation of biodiversity for economic  
67 growth and human well-being.

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71 **2. Background**

72 **2.1 Economic development, biodiversity crisis, and biodiversity protectionism**

73 Since the onset of the industrial revolution, which also marked the beginnings of the current biodiversity  
74 crisis, economic development has been the predominant societal goal in large parts of the world.  
75 Economic growth and wealth creation have been the main focus of this *development-for (the sake of)-*  
76 *development* approach. Economic development, rooted in neoclassical economics, may be defined as  
77 “rapid and sustained rise in real output per head and attendant shifts in production technology, factor  
78 input requirements, and the resource allocation of a nation” (Easterlin and Angelescu 2007, p. 113). It is  
79 often measured using indicators such as the gross domestic product (Acemoglu 2012). While this  
80 approach, rooted in capitalism and free markets, has led to unambiguous and largely desirable social and  
81 economic outcomes, these gains have been founded on remarkably high levels of overexploitation of the  
82 earth’s finite natural resources, ecosystems, and ecosystem services (Table 1). These resources are either  
83 inherently non-renewable (such as minerals and fossil fuel), or have become scarce due to  
84 overexploitation and related tradeoffs (e.g., forest products, other ecosystem services such as fresh air,  
85 clean water, or pollination services). Indeed, of the seven planetary boundaries, four that have been  
86 measured so far (biosphere integrity, climate change, biogeochemical flows, and land-system change) are  
87 already transgressed in pursuit of economic development (Steffan et al. 2015).

88 In response to the environmental and biodiversity crisis that began with the industrial revolution, there  
89 was a strong push for the creation of legally protected areas to protect the remaining areas of high  
90 biodiversity or relatively intact ecosystems - an approach that we describe as *conservation-for (the sake*  
91 *of)-conservation* (Table 1). The main goal of this approach was the conservation of biodiversity and it  
92 largely focused on creating protected areas free from humans. As a response to and embedded in the  
93 global capitalist order, this protectionist conservation approach too, much like the post-industrial model

94 of economic development (*development-for-development*), was founded on the doctrine of nature-  
95 people dualism (Buscher and Fletcher 2020).

96 The pursuits of *development-for-development* and *conservation-for-conservation* had both positive and  
97 negative social impacts. On the one hand, with economic development, societal inequalities such as those  
98 of gender and caste have been challenged with a push for a more equal society (Kothari 2019). On the  
99 other hand, they have contributed to wealth inequality or class injustice, repression, marginalization, and,  
100 in some areas, have caused increased conflicts and unrest (Faber and Schlegel 2017; Linarelli 2018).

101 Research on the impacts of other forms of social inequality based on aspects such as gender, class, caste,  
102 and race is scarce but studies suggest that social inequality can have strongly negative impacts on the  
103 environment (Hamann et al. 2018). Individual perceptions of fairness, aspirations, collaborations and  
104 market concentrations have been suggested as pathways of the connections between inequality and the  
105 environment (Hamann et al. 2018). Having focused primarily on exploiting nature’s instrumental values,  
106 the *development-for-development* approach resulted in suppressing other values for nature, knowledge  
107 systems, and indigenous worldviews (Chan et al. 2016).

108 Similarly, while the *conservation-for-conservation* approach has contributed significantly to biodiversity  
109 conservation in specific areas, it has functioned largely in a top-down manner, and often involved forced  
110 evictions and injustices for the poor, and further curtailment of their access to resources (Mishra et al.  
111 2017). Over time, the *de jure* sanctity of many protected areas from developmental pressures has also  
112 been violated to pave way for industrial scale exploitation of natural resources or for other economic and  
113 infrastructure interests (e.g. Menon et al. 2010, Leisher et al. 2013).

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## 115 **2.2 Poverty, conservation, and development**

116 Poverty has been ascribed to be one of the root causes of environmental and biodiversity problems  
117 (Barett, Travis, and Dasgupta 2011). However, there are multiple views –and implications– of the

118 relationship between poverty alleviation and biodiversity conservation, ranging from them being  
119 considered as belonging to separate policy realms at one extreme, to poverty alleviation being seen as a  
120 necessary condition to achieve biodiversity conservation on the other (Adams et al. 2004, Howe et al.  
121 2018). Conservationists have responded to this issue in two ways: (i) by focusing on the creation of  
122 protected areas which exclude local communities following the *conservation-for-conservation* approach,  
123 and (ii) working with local communities in biodiversity rich areas to promote conservation through social  
124 welfare and livelihood enhancement of people (Adams et al. 2004), that we have called the *development-*  
125 *for-conservation* approach (Table 1). Compared to the *development-for-development* approach that  
126 focused on economy and wealth, or the *conservation-for-conservation* approach that focused exclusively  
127 on biodiversity protection, the *development-for-conservation* approach, to some extent, took a relatively  
128 more integrated view of nature and economic development.

129 The *development-for-conservation* approach has largely been implemented through the so-called  
130 integrated conservation and development projects that try to enable conservation through incentives for  
131 local people in shared decision making, employment, revenue sharing and assistance in basic  
132 developmental parameters such as access, healthcare and education (Newmark and Hough 2000). This  
133 sustainable development approach was subsequently expanded to include social justice, equity and  
134 elimination of poverty amongst its goals (Adams et al. 2004). The *development-for-conservation* approach,  
135 while having the potential to promote biodiversity conservation over relatively much larger landscapes  
136 beyond protected areas, remained largely restricted to regions in and around protected areas. It arguably  
137 has had mixed effectiveness. For example, a study reported that less than 16% of the examined (n=32)  
138 World Bank funded projects aiming to address both biodiversity and poverty, resulted in significant gains  
139 in both aspects (Tallis et al. 2008).

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141 The idea of poverty being at the root of environmental degradation and biodiversity loss has been a simple  
142 and a powerful one. Theoretical and experimental research has indicated that income inequality may  
143 affect the willingness to pay (WTP) for environmental goods (Frank and Schlenker 2016; Baumgärtner et  
144 al. 2017). A society with more equal income distribution is thought to likely have higher WTP for  
145 environmental goods (Drupp et al. 2018). With income redistribution, the WTP of poorer households has  
146 been reported to increase, while that of the richer household to decrease (Baumgärtner et al. 2017; Drupp  
147 et al. 2018). High dependence of the poor on provisioning ecosystem services (Suich et al. 2015), and the  
148 significant spatial overlap between areas of extreme poverty and those of high biodiversity (Fisher and  
149 Christopher 2007), have presumably contributed to the notion of poverty being the main cause of  
150 biodiversity loss, and economic development as the panacea. The evidence, however, is questionable  
151 (Lambin et al. 2001, Barbier 2010, Kassa, Teferi, and Delelegn 2018), as is the associated environmental  
152 Kuznet's hypothesis that posits an improvement in environmental indicators *after* economic development  
153 has been achieved, indeed, at a significant cost to biodiversity and environment (Dinda 2004). Let alone  
154 environmental improvement, poverty alleviation itself has proven to be a highly complex issue. In the past  
155 50 years, the human population has doubled, the global economy has grown nearly 4 times and global  
156 trade 10 times, and there is enough food produced today to meet humanity's needs. Yet, more than one  
157 in 10 people around the world are currently undernourished (IPBES 2019).

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### 159 ***2.3 Development at the cost of the environment and biodiversity***

160 Together, *conservation-for-conservation* and *development-for-conservation* efforts have constituted the  
161 global conservation movement, with its efforts to limit and mitigate the impacts of the contemporary  
162 economic system. They have contributed to protection of many species and habitats, and have helped  
163 generate awareness regarding the ongoing environmental crisis. However, attempts to bridge  
164 conservation and development have been complicated due to the wicked nature of conservation

165 problems. Much of environmental degradation is driven by the *development-for-development* approach,  
166 rooted in neoclassical economics. It puts pressure on natural resources, as most economic production  
167 relies on raw materials and energy derived from nature (Georgescu-Roegen 1971; Farley and Costanza  
168 2010). For example, large-scale agriculture relies on the conversion of rangelands, forests or other natural  
169 ecosystems. The *development-for-development* approach involves economies of scale, relying on the  
170 over-exploitation of natural resources (Dasgupta 2021). Further, the costs and benefits of over-  
171 exploitation of resources tend to be ‘ecologically unequal’, with high-income countries having better  
172 access to natural resources and low-income countries facing greater social, ecological, and economic  
173 consequences of overexploitation (Dorninger et al. 2021). These inequities, largely driven by historical  
174 power asymmetries, continue to be perpetuated by the current economic development model (Mahutga  
175 2014). Even the multi-billion-dollar global illegal wildlife trade is fuelled largely by the demands of the  
176 affluent rather than the needs of the rural poor (Graham-Rowe 2011), although the act of poaching itself  
177 may be undertaken by the poor as a source of livelihood or protein. Despite the ongoing environmental  
178 and biodiversity crises, and despite the negative effects of pollution and extreme climatic events on  
179 humans themselves, the *development-for-development* model continues to drive forward (Dinda 2004),  
180 threatening humans and the diversity of life on earth. The unprecedented social and economic disruption  
181 caused by the ongoing COVID-19 pandemic well-illustrates how ill-prepared humanity is to deal with  
182 catastrophes and the indirect effects of globalization and planetary change (Engler et al. 2021, Mishra et  
183 al. 2021).

184 In the face of this aggravating planetary crisis, there are calls for transformative economic, political and  
185 technological change to help meet international environmental and societal goals, such as those in the  
186 2030 agenda for sustainable development, or in the Aichi Biodiversity Targets (IPBES 2019). Indeed,  
187 considering the current course of the state of the environment and biodiversity, and of the nature and  
188 impacts of economic growth, it is clear that without transformative change, there is little hope for



189 preservation of the planet’s fast dwindling diversity of life, or for a human society living in wellness and  
 190 harmony with nature.

191 Recognizing the importance of nature for human survival, and the reality that the current models of  
 192 development have breached planetary boundaries, different disciplines have offered a range of lenses to  
 193 address environmental and conservation issues. For example, the field of ecological economics explores  
 194 ideas of distributive and environmental justice and trade-offs in relation to the environment (Martínez-  
 195 Alier 1997; Pelletier 2010); conservation biology offers ideas of resilience and ecological tipping points  
 196 (Gunderson 2000), and philosophy offers understanding worldviews and human-nature values  
 197 (Knippenberg et al 2018). Based on these ideas from multiple disciplines, alternative approaches to more  
 198 sustainable use of nature have been proposed. Some also recognize the cultural linkages that humans  
 199 have with nature, thereby moving away from nature-people dualism (Table 2).

200  
 201 Table 1. Main characteristics of the predominant approaches to economic development and biodiversity  
 202 conservation

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	Development-for-development	Conservation-for-conservation	Development-for-conservation	Conservation-for-development
Goal	<ul style="list-style-type: none"> <li>● Economic development and wealth creation</li> </ul>	<ul style="list-style-type: none"> <li>● Conservation of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>● Conservation of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>● Economic development and conservation of biodiversity</li> </ul>
Approach	<ul style="list-style-type: none"> <li>● Nature-people dualism rooted in capitalism</li> </ul>	<ul style="list-style-type: none"> <li>● Nature-people dualism rooted in capitalism</li> </ul>	<ul style="list-style-type: none"> <li>● Nature-people dualism to some extent, rooted in capitalism</li> </ul>	<ul style="list-style-type: none"> <li>● Nature-people integration</li> </ul>
	<ul style="list-style-type: none"> <li>● Free markets, unsustainable exploitation of natural resources</li> </ul>	<ul style="list-style-type: none"> <li>● Spatially explicit protected areas for conservation</li> </ul>	<ul style="list-style-type: none"> <li>● Poverty alleviation, improvement in living standards and livelihoods for enhanced biodiversity conservation.</li> </ul>	<ul style="list-style-type: none"> <li>● Spatially explicit landscape planning for ecosystem services-based economic development and biodiversity conservation</li> </ul>

	<ul style="list-style-type: none"> <li>• Economies of scale</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal or limited human use of ecosystem services in protected areas</li> </ul>	<ul style="list-style-type: none"> <li>• Spatially explicit protected areas and surrounding regions</li> </ul>	<ul style="list-style-type: none"> <li>• Economies of value bounded by conservation imperatives</li> </ul>
			<ul style="list-style-type: none"> <li>• Sustainable human use of ecosystem services</li> </ul>	

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206 Table 2: A sample of alternative development models proposed in literature

Development Model	Description	Economic components	Social components	Ecological components	Critique	References
Green economy	Address economic and ecological issues and alleviate poverty through a low-carbon production process, resource efficiency, green investment, technological innovations, recycling, greenjobs, poverty eradication, and social inclusion	Sustainable consumption and production, green businesses and tax reforms	Social inclusion	Decouple growth from natural capital depletion by reducing resource use and increasing resource efficiency	Focus on growth, which can result in a material increase in resource extraction for the production of goods and services. Measured in money and serves the logic of profits and capital accumulation. Doesn't solve environmental problems, displaces them. It does not counter capital-intensive mining, large-scale climate change resilient infrastructure, or emission trading	Bina 2013; Loiseau 2016
Circular economy	Reduce the use of raw materials in order to reverse the extractive model of the current economic system; boost reuse practices, avoid discarding patterns for matters that still have use value for different actors in society; increase recyclability of goods by implementing	Focus on economic growth	No social aspect	Reduces pressure on the ecosystem by reusing materials	Focus on growth and accumulation. Becoming wealthier does not ease pressure on natural resources	D'Alisa 2019

	effective market arrangements					
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<p>Nature-based solutions (NbS)</p>	<p>Nature-based Solutions are actions that work with and enhance nature to help address societal challenges. The concept is grounded in the knowledge that healthy natural and managed ecosystems produce a diverse range of services on which human well being depends. It is an ‘umbrella concept’ for other established nature-based approaches such as ecosystem-based adaptation (EbA) and mitigation (EbM), eco-disaster risk reduction (eco-DRR), Green and climate change resilient Infrastructure (GI) and natural climate solutions (NCS).</p>	<p>Nature provides economic benefits. Protecting nature prevents economic losses. Economic crises can be averted by natural solutions.</p>	<p>Nature provides societal benefits</p>	<p>Nature is needed for resilience and economic and societal benefits</p>	<p>Effectiveness has not been rigorously assessed. There are concerns over reliability and cost-effectiveness compared to engineered alternatives, and their resilience to climate change. Trade-offs can arise if climate mitigation policy encourages NbS with low biodiversity value, such as afforestation with non-native monocultures. This can result in maladaptation, especially in a rapidly changing world where biodiversity-based resilience and multi-functional landscapes are key.</p>	<p>Cohen-Sachem 2016</p>
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<p>Degrowth</p>	<p>Democratically led redistributive downscaling of production and consumption in industrialized countries as a means to achieve environmental sustainability, social justice, and well-being.</p>	<p>A societal project that implies escaping from the existing economy as a material reality. Considered a non-economic concept</p>	<p>Articulates principles of environmental justice and democracy, to formulate strategies including oppositional activism, grassroots alternatives, and institutional politics.</p>	<p>Recognizes that economic growth is not possible with environmental degradation. Therefore calls for a slowdown of economic growth to save nature.</p>	<p>It can increase unemployment, increase poverty, and decrease per capita income.</p>	<p>Kallis et al. 2012</p>
<p>Ecofeminism</p>	<p>Spell out historical, material, and ideological connections between the subjugation of women and the domination of nature. They speak to a diverse body of political theory, including feminist, decolonial, and environmental ethics, urging examination of how fundamental concepts are embedded in and corrupted by traditional sex-gendered assumptions</p>	<p>Complex class, ethnic, and sex-gendered characteristic of capitalist appropriation is challenged. Connects the dots between overconsumption in the global north, and taps and sinks in the global south</p>	<p>Articulates concerns about social equality by linking it to environmental justice and integrity.</p>	<p>Total reconstruction of relations between humans and nature, and men and women.</p>	<p>Criquet for the view that women are closer to nature or greater affected by environmental degradation.</p>	<p>Terreblanche 2019</p>

Eco-Anarchism	Simpler lifestyles with less consumption and growth, small and highly sustainable local economies, built on values of frugality, self-sufficiency, giving, sharing and cooperating, and the rejection of acquisitiveness and competition.	Economy that has no growth, and is not driven by profit or market forces, and produces much less than the present economy	Focus on values such as frugality, self-sufficiency, giving, sharing and cooperating, and the rejection of acquisitiveness and competition. Small communities in charge of their own land	Lesser resource use, and decrease overall pressure on nature	Practical details on how this can be achieved are missing	Davidson 2009
Eco-swaraj	This approach respects the limits of the earth and the rights of other species, while pursuing the core values of social justice and equity. Seeks to empower every person to be a part of decision-making, and its holistic vision of human well-being encompasses physical, material, socio-cultural, intellectual and spiritual dimensions. Eco-swaraj places collectives and communities at the centre of governance and economy. Encompasses five spheres:	Local communities have control over their means of production, distribution, exchange, and markets. Localization is a key principle providing for all basic needs through the local regional economy	Focus on lives that are fulfilling and satisfactory physically, socially, culturally, and spiritually. Equity, responsibility across gender, class, caste, age, sexualities, and other divisions.	Includes the conservation and regenerative capacity of nature. Humans are a part of nature and the rest of nature has a right to survive		Kothari 2019

ecological wisdom and resilience, social well-being and justice, direct or radical political democracy, economic democracy, and cultural knowledge and plurality.						
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<p>Beun vivir or the Good life</p>	<p>South American perspectives that question development and core components of modernity, while offering alternative. It includes different visions specific to each social, ecological, and historical context.</p>	<p>Rejects the idea of economic growth as a sign of progress. Relationships between communities extend beyond market linkages and utilitarianism and incorporate reciprocity, complementarity,, redistribution, etc.</p>	<p>Questions existing societal power structures and colonial history. Values interculturality, social inclusion, traditions of knowledge, and refound politics on plurinationality</p>	<p>There is no separation between humans and nature. All living being have a right to life and there are complex linkages between all living beings, including people</p>	<p>Critiqued for being a reflection of indegenous reductionism. They are a distraction from the true objective which is not alternatives to development, but alternatives to capitalism.</p>	<p>Acosta 2017</p>
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<p>Biocivilization</p>	<p>The core guiding principle of biocivilization is caring for the ethics of both collective and individual responsibility, with regard to all relations and processes, in terms of economy and in terms of power, in science and in technology. The pillars of biocivilization are: doing the best that is possible locally; keeping the commons at the centre; creating decent work shared among all men and women; ensuring human rights, equality, freedom, happiness, and the fulfilment of peoples' potentialities, in all their diversity and according to their will.</p>	<p>Relationship with nature is the core of sustainability. Focus on developing local economies, and keeping economies local. Focus on caring, living together, and sharing</p>	<p>Social inclusion and equality. Environmental destruction viewed as an aspect of social inequality</p>	<p>All living beings have a fundamental right to exist</p>	<p>Failure to analyze the qualitative aspects of economic growth and its emphasis on the local economy without recognizing the urgency to address global anthropogenic change from a transnational political perspective.</p>	<p>Gryzbowski 2019</p>
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Doughnut economics	Based on the concept of planetary boundaries, which identifies nine planetary boundaries beyond which lie unacceptable environmental degradation and tipping points. Brings together social and environmental concerns in a single framework.	Economic growth must take place within the planetary boundaries. New metrics for defining and measuring economic growth	Social justice	Focused on environmental sustainability	Still a new and evolving concept	Haworth 2017
Ecomodernism	Human activity to be concentrated in dense pockets of cities and farms and leave more room for wildlife. The goal is to shrink humanity's total environmental impact and to achieve economic development for all. Technological solutions for environmental problems.	Focus on intense economic development in certain zones	No social component. Ecomodernism believes poor communities degrade their environment	Humans and nature decoupled with areas set aside for only wildlife	Ecomodernism actually leads to greater environmental damage, not lesser. It appeals to the dominant worldview, as they believe they can continue their current lifestyles of comfort if they invest in cleaner technologies, and "urbanize" the poor.	Asafu-Adjaye 2015

208 **3. An alternative approach: *conservation-for-development***

209 Global conservation efforts driven by protection and exclusion, and economic development driven by  
210 consumerism, and economies of scale, have been locked in an adversarial relationship with negative  
211 consequences for each other (Folks 2006). This is where an alternate approach to global development,  
212 that synergizes economy with ecology, has the potential to help humanity move towards a more  
213 sustainable planet. The field of ecological economics since its emergence in the 1980's has attempted to  
214 explicitly link human well-being and development with nature (eg. concept of natural capital; Costanza  
215 and Daly 1992, Millennium Ecosystem Assessment 2005), recognizing that development needs to occur  
216 within nature's limits, and coupling development and issues of justice, i.e "grounding economics in the  
217 moral and biophysical environment" (Daly and Farley 2011, p. 3)

218 Here we build on these ideas, and offer a simple development approach that is built on the conservation  
219 of biodiversity and the sustainable use of ecosystem services. Such an approach could ensure that harvest  
220 of natural resources stays within the limits of sustainability and planetary boundaries (Steffan et al. 2015).  
221 To contrast it with earlier paradigms including *development-for-development*, *conservation-for-*  
222 *conservation* or *development-for-conservation*, we call it the *conservation-for-development* approach.  
223 Rather than economies of scale, it focuses on economies of value, where premium commodity values are  
224 generated through their linkages with local ecosystems, cultures, sustainable use of ecosystem services,  
225 and contribution to biodiversity conservation.

226 The *conservation-for-development* approach is built partly on the concept of ecosystem services (ES) and  
227 nature's contribution to people (NCP) (Millennium Ecosystem Assessment 2005, Pascual et al. 2017). The  
228 ES concept initially focused on human well-being and instrumental values, i.e., the use of nature as a  
229 means to a human end. The concept has been criticized for its anthropocentric perspective, promoting a  
230 potentially exploitative paradigm, and with limited focus on cultural ecosystem services (Schröter et al.  
231 2014). The NCP framework expanded on the original ES concept to address these criticisms and

232 encompasses the multiple values and cultural relationships that people have with nature (Pascual et al.  
233 2017). Both these concepts explicitly recognize that nature is essential for various aspects of human  
234 existence – biological, economic, and cultural. All of humanity and most other life on the planet relies on  
235 clean air and water; more than 2 billion people rely on fuelwood; 4 billion on natural medicines; 75% of  
236 global food crops rely on animal pollination; and terrestrial and marine ecosystems are responsible for  
237 sequestration of 60% of global carbon emissions (IPBES 2019). Such benefits from ecosystems can be  
238 valued in both monetary and non-monetary terms. Yet, in the *development-for-development* model of  
239 economic and industrial growth, these contributions or their sustainability concerns are usually  
240 unrecognized, unaccounted for, or undervalued, and, as a consequence, they continue to be rapidly lost  
241 or degraded. Here, while we use the more common term ecosystem services based on the assumption  
242 that citizens and policy-makers are more familiar with it, our scope is wider, encompasses NCP, and  
243 includes the multiple worldviews and values that people have for nature.

244 In suggesting the *conservation-for-development* approach, we draw partly from existing alternative  
245 development ideas (Table 2) and sketch out a spatially-explicit ES-based approach for conservation,  
246 entrepreneurship, social equity and economic development. Defining elements of *conservation-for-*  
247 *development* model include its spatially-explicit, landscape approach to development and conservation,  
248 and a move away from nature-people dualism (Table 1). The term conservation-for-development has  
249 been used previously in literature to highlight ideas such as nature being essential for human well-being  
250 (Folke 2006), protecting environmental integrity for ecologically and economically sound development  
251 (Åshuvud 1991), and conservation being considered a part of sustainable development (Green and  
252 Barborak 1987). In this perspective piece, we use the term *conservation-for-development* to specifically  
253 refer to an approach that is built on ideas outlined below.

254 In the *conservation-for-development* approach, we envision the designation of landscape scale ‘Special  
255 Ecological Zones’ that are segregated into land use categories ranging from protected ‘Critical Wildlife

256 Zones’ on the one hand, to ‘Economic Development Zones’ on the other, that focus on non-extractive  
257 industries and agriculture, with intermediate ‘Ecosystem Harvest and Stock Zones’ with low impact human  
258 activity (Fig. 1). A rigorous ES framework can be used to develop these land use plans in conjunction with  
259 the local communities and cultures.

260 The *conservation for development* approach is meant to be spatially and contextually specific, and it rests  
261 on five main pillars designed to safeguard biodiversity, culture, and economic well-being.

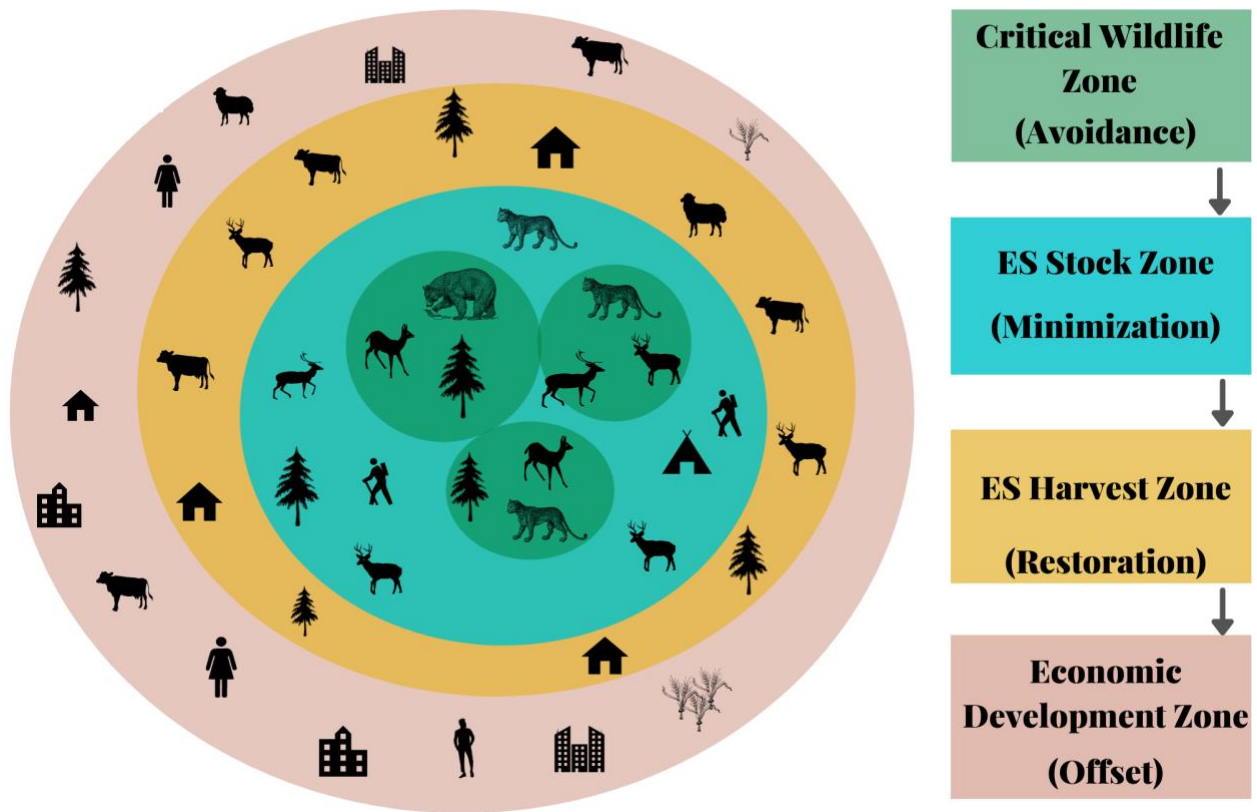
- 262 1. **Spatially explicit conservation framework** that sets the boundary conditions for the  
263 sustainable utilization of ecosystem services together with species and habitat conservation.  
264 This framework is designed to provide the foundation for regional environmental  
265 management and land use policy as well as the basis for guidelines and rules which the  
266 economic enterprises would need to comply with.
- 267 2. **Ecosystem services focus** where the landscape is viewed as a source of a wide range of  
268 provisioning, regulating, and cultural ecosystem services that are critical for human well-being  
269 (Millennium Ecosystem Assessment 2005).
- 270 3. **Sustainable value enterprise model** premised on the creation of a set of globally and locally  
271 viable enterprises focusing on economies of value over economies of scale, that are  
272 economically profitable and ecologically sustainable, and are driven by the regional ecological  
273 wealth, cultural heritage, and social capital.
- 274 4. **Socio-economic inclusion** across gender, class, and other social divisions.
- 275 5. **Wide-ranging partnerships** that bring together a combination of scientific knowledge,  
276 development expertise, conservation experience, business acumen, technology capabilities,  
277 and financial capital.

278

279

280 **3.1 Spatially explicit conservation framework**

281 In the *conservation-for-development* approach, the landscape of interest is designated as a special  
282 ecological zone and is mapped based on biodiversity values, ecosystem service stock and flows, land  
283 tenure and current human use. In partnership with local communities, relevant government authorities  
284 and other stakeholders, the landscape is categorized into four zones, somewhat along the lines of how  
285 protected area zonation is undertaken (Figure 1). A zone-specific mitigation hierarchy is designed to  
286 ensure a net gain in measures of biodiversity and ecosystem functioning while meeting the goals of  
287 economic growth.



288  
289 Figure 1: Mitigation hierarchy and zonation mapping of special ecological zones under the *conservation*  
290 *for development* model.

### Critical Wildlife Zone

- Priority: Biodiversity and Wildlife Conservation
- Mitigation Hierarchy: AVOIDANCE
- No permanent infrastructure or habitation
- Research, monitoring and protection
- Regulated visits, temporary camping for research
- Very low intensity livestock grazing where necessary
- Maintain wildlife populations ( $N_c$ ) at carrying capacity ( $K$ ) over the long-term, enable conditions where birth rates ( $bc$ ) exceed rates of mortality ( $mc$ ), and rates of emigration ( $ec$ ) are considerably higher than immigration rates ( $ic$ ) to enable spill-over effects:

$$N_c \approx K$$

$$bc > mc$$

$$ec \gg ic$$



### Ecosystem Services Stock Zone

- Priority: Forest, Habitat and Ecosystem service Conservation
- Mitigation Hierarchy: AVOIDANCE / MINIMIZATION
- No activity that degrades or pollutes
- Ecosystem service stocks identified and protected
- Ecosystem services flow is ensured to downstream populations
- Research, monitoring and protection
- Sustainable, energy efficient infrastructure
- Sustainable, low intensity livestock grazing
- Maintain wildlife populations ( $N_{es}$ ) close to carrying capacity ( $K$ ) over the long-term, enable conditions where birth rates ( $bes$ ) exceed rates of mortality ( $mes$ ), and rates of emigration ( $ees$ ) are higher than immigration rates ( $ies$ ) to enable spill-over effects:

$$N_{es} \approx K$$

$$bes > mes$$

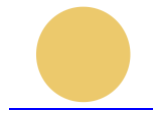
$$ees > ies$$





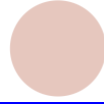
### **Ecosystem Services Harvest Zone**

- Priority: Ecosystem Services Harvest for Human Welfare
- Mitigation Hierarchy: MINIMIZATION / RESTORATION
- Livestock grazing, bee keeping, sustainable harvest of other ecosystem services such as clean water, etc.
- Research, monitoring and protection
- Low impact infrastructure in support of livelihoods
- Estimate the desirable wildlife population size (Neh), which will be a function of the trade-off between conservation and ecosystem service harvest objectives – and ensure that populations are maintained around that level:
  - $N_{eh} = K - f(H)$
  - $beh + ieh \geq meh + eeh$
  - where  $f(H)$  is a function by which the wildlife population size is reduced below carrying capacity as a result of an acceptable level of harvest of provisioning ecosystem services.



### **Economic Development Zone**

- Priority: Industrial and Agricultural Production
- Mitigation Hierarchy: OFFSET  
Agro-Processing and other industry, special economic zones.



291

292 This approach of zonation, use and mitigation hierarchy would serve as the basis for conservation efforts

293 and land use planning. Together, the critical wildlife areas and ecosystem service stock zone, for example,

294 effectively serve the purpose similar to what a protected area typically serves. The ecosystem service

295 harvest zone allows for the sustainable use of natural resources, while the economic development zone

296 is dedicated to infrastructure, production, housing and other needs of enterprises. All enterprises set up

297 in this zone must comply with this spatially explicit conservation and ecosystem services framework, in

298 addition to meeting other relevant sustainability standards and certification. Unlike existing land use

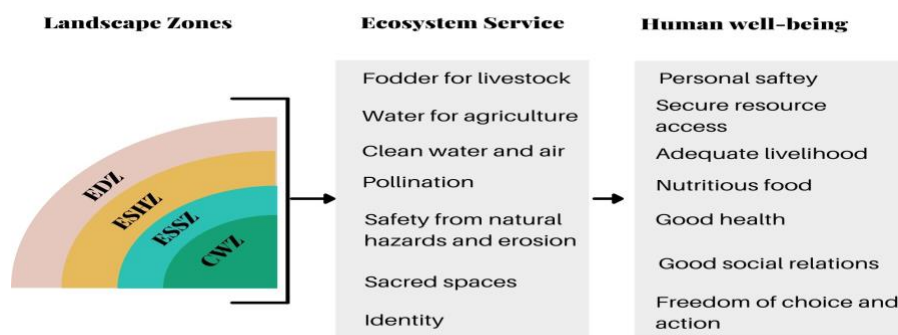
299 systems, however, in this model, the various zones and activities are typically linked and serve as resource  
 300 catchments for each other.

301

302 **3.2 Ecosystem services focus**

303 In the *conservation-for-development* model, the focal landscapes are not viewed solely as engines for  
 304 economic growth or sources of ecosystem services, nor are they envisioned to become inviolate areas for  
 305 strict protection of biodiversity. Instead, they are viewed as coupled social-ecological systems where  
 306 biodiversity as well as ES stocks must be preserved, and ES flows used sustainably for human welfare and  
 307 economic growth (Figure 2).

308 The approach thus involves (i) developing a comprehensive understanding of society and land tenure, and  
 309 an economic and socio-cultural valuation and mapping of the landscape’s ES, (ii) creating a management  
 310 system that optimizes the use of ES for welfare while conserving biodiversity, and increasing the resilience  
 311 of the social-ecological systems, and (iii) setting up enterprises that comply with the management system  
 312 and other sustainability and certification systems mandated and overseen by the governance and  
 313 management bodies.



314 Figure 2: An ecosystem services based representation of the *conservation for development* model (EDZ:  
 315 Economic Development Zone, ESHZ: Ecosystem Services Harvest Zone, ESSZ: Ecosystem Services Stock  
 316 Zone, CWZ: Critical Wildlife Zone).

317 **3.3 Sustainable value enterprise model**

318 Central to the *conservation-for-development* approach would be a set of ecologically sustainable  
319 commercial enterprises that prioritize value over scale. For instance, local traditional strengths in  
320 agriculture can be combined with a range of innovative technologies and practices to develop a organic  
321 and environmentally less damaging products ranging from vegetables and fruits, fibre, to processed  
322 products (Fornandez et al. 2013). These products can tap into the rapidly expanding community of  
323 consumers in the global as well as growing regional markets (Rahmaniah et al. 2020). Local experience in  
324 livestock management, when combined with a range of meat or dairy packing, storage and transport  
325 technologies, can afford an alternative to industrial scale animal production, and allow for the possibility  
326 of developing niche businesses that offer a range of unique products (Jouzi et al. 2017; Ho et al. 2018).  
327 There will be a critical need for the development of a well-trained workforce with a diverse set of industry  
328 specific vocational skills, appreciation of sustainability science and more general technology expertise and  
329 business management capabilities. Enterprises set up to impart training in these skills, while generating  
330 value for the local communities, can also form a vital component of the economy.

331

332 **3.4 Socio-economic equity**

333 The *conservation-for-development* approach recognizes that social, economic, political, and ecological  
334 issues are interconnected. Socio-economic inequality can lead to increased environmental degradation.  
335 Critical in this approach is the inclusion of various sections of the local societies, across different societal  
336 barriers and power structures, and other relevant stakeholders.

337

338 **3.5 Wide-ranging partnerships**

339 Participation of international networks of experts and institutions is vital for the economy. In an  
340 increasingly globalized world, the transfer and application of technologies developed in one part of the

341 world to businesses in another part can often unlock synergies and value for local and global economies.  
342 Local enterprises can benefit from obtaining access to specific technologies in soil, water and crop  
343 management that have been developed in other country markets. Mutually beneficial commercial  
344 partnerships with globally experienced companies can help local entrepreneurs introduce novel business  
345 models and create unique value propositions for global and local customers.

346 Financial investments will be of utmost importance for growth of the enterprises. Recent times have seen  
347 encouraging growth in the community of global conservation financiers driven by the need to preserve  
348 natural ecosystems while utilizing them for economic development. A range of innovative financial  
349 instruments, that include debt, equity and grant funding have been employed (Berghöfer et al. 2017).  
350 Such opportunities could help fulfil investment requirements of this green economy. Investors in this  
351 community range from high-net-worth individuals to foundations and sovereign funds.

352 The short-term outcomes would be to garner political support for the *conservation-for-development*  
353 approach; attract investors for resources and knowledge transfer; and motivate local communities and  
354 entrepreneurs to participate and take ownership. Government support, global investors, and local  
355 partnerships can lead to the longer term impact of protecting biodiversity while ensuring economic  
356 development and improved human well-being in the landscapes of interest.

357 Several existing tools can be used for the on-ground implementation of this approach. The spatially explicit  
358 framework, one of the cornerstones of the *conservation-for-development* approach, could be facilitated  
359 through tools such as Systematic Conservation Planning (Marguels and Pressey 2000), which uses specific  
360 protocols to identify priority areas for biodiversity. Governments could formally recognize spatially explicit  
361 zones through legislations and tax benefits for investors and entrepreneurs, such as tax benefits provided  
362 by the green economic policies in the Kyrgyz Republic (Hao et al. 2019).  
363

364 Market instruments such as green bonds (Flammer 2021), payments for ecosystem services (Wunder  
365 2007), auctions (Latacz-Lohmann and Van der Hamsvoort 1998), tradable permits (Hartig and Drechsler  
366 2009), and conservation trust funds (Doinjashvili, Méral, and Andriamahefazafy 2021) could be  
367 operationalized to increase investments in ecosystem services and biodiversity following this approach  
368 (Flammer 2021). Certification schemes or similar concepts that provide additional market value can be  
369 used to increase income without increasing the use of ecosystem services for the sustainable enterprises  
370 (Gullison 2003). Newer ideas based on non-market instruments such as conservation basic income for  
371 individuals living close to conservation critical areas can also be explored to ensure sustainable use of  
372 ecosystem services and biodiversity, and for social inclusion and equity (Fletcher and Büscher 2020).  
373 Approaches such as the Partners Principles for community engagement for conservation can be followed  
374 to ensure that the local communities and other stakeholders are engaged ethically and beneficially  
375 through the process (Mishra et al. 2017).  
376 Many of the above-mentioned tools can have varying outcomes for biodiversity conservation and social  
377 well-being based on the context and implementation. Market based instruments, in particular, can  
378 potentially lead to the *crowding-out* of intrinsic motivations for conservation (Rode, Gómez-Baggethun,  
379 and Krause 2015). However, there is also research to support *crowding-in* and increasing motivation for  
380 conservation (Rodríguez-Sickert, Guzmán, and Cardenas, 2008). Careful review and contextual planning  
381 will be important for the implementation of these tools. Continuous monitoring and evaluation of the  
382 programmes can ensure that they help meet biodiversity and human well-being outcomes.

383

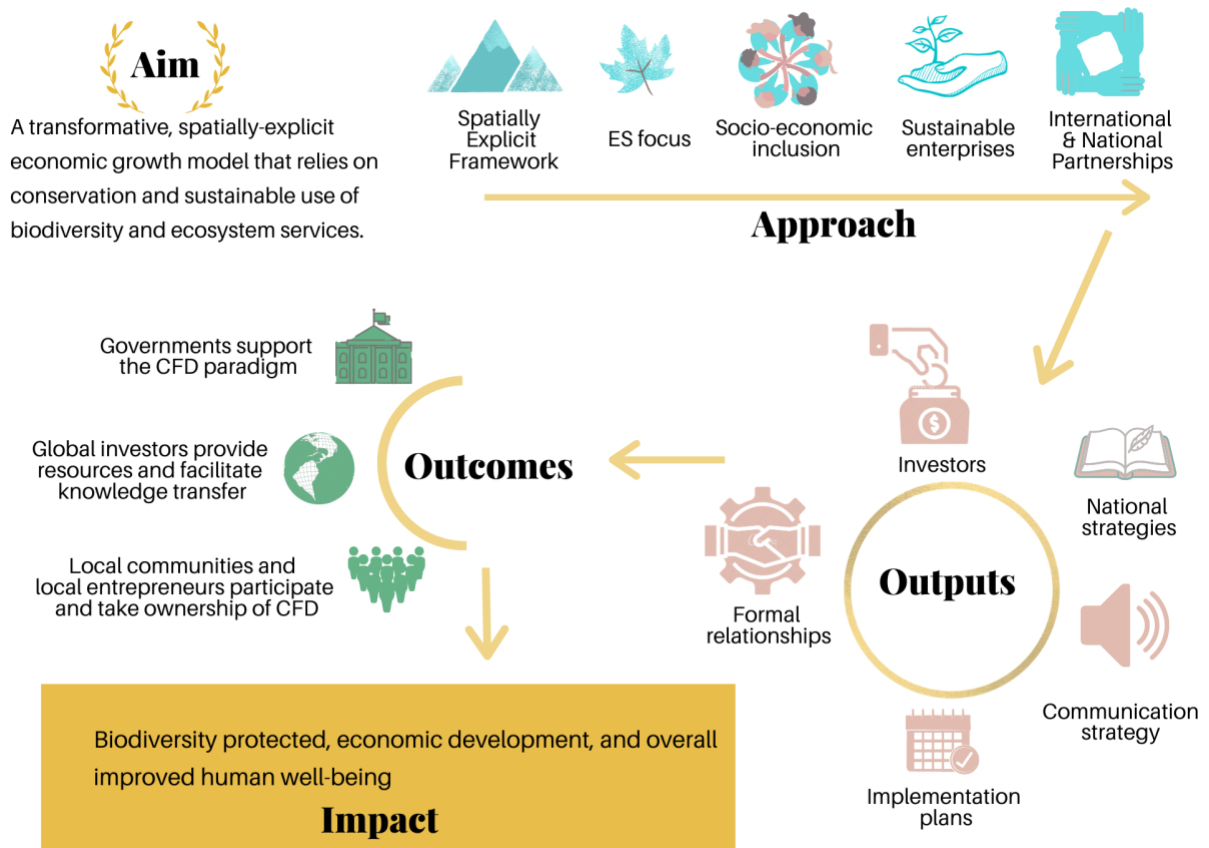
### 384 **3.6 Limitations of the *conservation-for-development* model**

385 There are several potential limitations of the *conservation-for-development* model. Its application  
386 requires the involvement of multiple stakeholders with different visions, values, and interests for any  
387 landscape. Aligning these differing values and interests for a common goal can be a challenge, especially

388 as value trade-offs may also need to be addressed. Managing power imbalances in these situations can  
 389 be a challenge. The model requires a landscape perspective, which can be expensive and cumbersome to  
 390 implement. For this model to be attractive, the economic benefits from sustainable enterprises must  
 391 eventually compete with benefits from other enterprises. The benefits provided by nature and ecosystem  
 392 services are often hard to measure or articulate, so these might not be directly visible to the stakeholders  
 393 or to the consumers.

394

395 **5. Conclusion**



396

397 Figure 3: A simplified theory of change for the *conservation-for-development* approach showing the  
 398 strategic vision, the approach, the outcomes, and the overall impact expected.

399

400 The vision of the *conservation-for-development* approach is to create a transformative, spatially-explicit  
401 development model that relies on conservation and sustainable use of biodiversity and ecosystem  
402 services (Figure 3). The approach could assist in nature conservation and economic development, bring  
403 people and nature closer, and move away from human-nature dualism that has so far characterized both  
404 economic development and biodiversity conservation efforts.

405

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410 harmonize economic development with conservation.

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