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EIA-driven biodiversity mainstreaming in development cooperation: Confronting expectations and practice in the DR Congo

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ABSTRACT

Mainstreaming biodiversity in development cooperation activities is called for by scientists and policy-makers alike, as the current biodiversity crisis can only be mitigated if the linkages between biodiversity and human wellbeing are acknowledged. Reconciling biodiversity conservation and human development is a particularly topical challenge in highly biodiverse developing countries such as the Democratic Republic of Congo (DRC), where the population is highly dependent on natural resources for their livelihood. This study combines expert interviews with an evaluation of environmental impact assessment (EIA) reports, in order to determine the current motivations, obstacles and effectiveness of biodiversity mainstreaming in the DRC and to assess the framing, the representation and use of biodiversity in recently conducted EIAs in the DRC. Our findings indicate that biodiversity mainstreaming in the DRC is considered challenging due to enduring contextual (*e.g.* governance) factors; and that there is a strong support base for EIA among the interviewed experts. Turning to actual EIAs that were recently performed in the DRC, the diversity of framings motivating the uptake of biodiversity is remarkable. Instrumental reasons do not thwart intrinsic motivations –which is indicative of a support base for the non-instrumental value of biodiversity. The use of biodiversity baseline data in mitigation measures is low, and the taxonomic resolution of the biodiversity data in EIAs is uneven. Despite these challenges, the potential of EIA in the DRC is considered high, and linkages between project-driven EIA practice and biodiversity data collection and dissemination should be strengthened.

1. Introduction

Biodiversity is facing a crisis at the global and local level. All dimensions of biodiversity are under –anthropogenic – pressure (Steffen et al., 2015). This situation threatens human wellbeing in direct and indirect ways as human systems and -biodiversity-based- natural systems are closely intertwined (Martin-Lopez and Montes, 2015). Sustaining and preserving 'nature's contributions to people' is now considered a key priority, as biodiversity loss alters the functioning of ecosystems and their ability to provide people with goods and services (Diaz et al., 2018; Cardinale et al., 2012). This is especially the case in Africa, where a substantial part of the population relies directly upon functioning ecosystems for the provision of a steady flow of essential goods and services (IPBES, 2018). This is recognized by both conservation and development professionals, whose shared views on the positive linkages between conservation and development objectives present an opportunity for concerted action (Biggs et al., 2018; Roe et al., 2013).

Despite this realization, biodiversity metrics indicate a continuing decline of biodiversity and many ecosystem services across Africa (Costanza et al., 2014; IPBES, 2018). Food and raw materials coupled with

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agriculture are key ecosystem services in the forested parts of western and Central Africa, while tourism, water and grazing are prevalent in the (semi-)arid South and South-West (Egoh et al., 2012). However, area-specific in-depth studies on ecosystem services are still too rare, especially and paradoxically in some global biodiversity hotspots (Pires et al., 2018), reflecting an enduring research bias (Di Marco et al., 2017).

Development cooperation is defined as the range of international efforts aimed at supporting development, which is not driven by profit, discriminates in favour of developing countries. It is based on cooperative relationships that seek to enhance developing country ownership and aims to raise human wellbeing (UN ECOSOC, 2015). Development cooperation has, as a rule, been organized as a sector-based effort. Indeed, cooperation efforts are typically directed specifically at agriculture, or at health, or at education *etc*. Yet all development is linked to and/or impacts biodiversity, whether directly or indirectly (Drutschinin et al., 2015; Kok et al., 2008; Suich et al., 2015). This by no means implies that the efforts to improve human wellbeing and to conserve biodiversity necessarily lead to win-win solutions. However the increasing acknowledgement of biodiversity-development linkages, which were highlighted most recently by the ongoing work of the Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services (IPBES) (Diaz et al., 2015; IPBES, 2018), has led to the recognition that biodiversity conservation should be an integral part of effective development cooperation. International policy forums are calling for joint action for biodiversity and development, *e.g.* in the 2010 Nagoya Declaration on Biodiversity in Development Cooperation and in the Global Strategic Plan for Biodiversity 2011–2020, which calls for biodiversity integration into development strategies (CBD, 2010).

Efforts to integrate biodiversity as a new issue in sectors that have not systematically addressed it so far, is referred to as 'mainstreaming'. The motivation behind mainstreaming is rooted in the understanding that the causes of biodiversity loss lay within the remit of other policy domains or sectors (Karlsson-Vinkhuyzen et al., 2017). Hence, these sectors need to address biodiversity issues in order to curb the negative biodiversity trends. Biodiversity conservation hence requires a whole-of-government approach (Adenle et al., 2015). Biodiversity mainstreaming in development cooperation is now an established stated policy goal of most multilateral (*e.g.* the OECD, the World Bank, the European Union) and bilateral (*i.e.* individual countries) providers (Drutschinin et al., 2015; Kok et al., 2008; Persson, 2009), and is supported by the international policy architecture of the Convention on Biological Diversity (CBD).

In practice mainstreaming encompasses a range of approaches, structured along the 'entry points'. Entry points are situated at the national, sectoral, project and local level. Intervening at any of these entry points can be done in a variety of ways, ranging from spatial planning to environmental fiscal reform, awareness raising, capacity-building and impact assessment (Drutschinin et al., 2015; OECD, 2012; Vanhove et al., 2017).

Impact assessment, a process aiming at the identification of the future consequences of current or planned actions (IAIA, 2015), is promoted by the Convention on Biological Diversity (CBD, 2018) as a means of integrating biodiversity in policies. In development cooperation, impact assessment mostly takes on the form of environmental impact assessment (EIA) at project level, and of strategic environmental assessment (SEA) at policy, plan or programme level. The application of impact assessment contributes to internalize the costs and benefits of the conservation and sustainable use of biodiversity (Tallis et al., 2015). Impact assessment has been used to integrate cross-cutting development-relevant issues (among which biodiversity) in development cooperation since the 1980s (SIDA, 1998; OECD DAC, 1992). Although the philosophy and systematic approach of impact assessment has by now reached almost all countries, biodiversity is not necessarily adequately considered in impact assessments and in development cooperation in general (Verissimo et al., 2014; Hugé et al., 2017). Indeed, impact assessment (in its various forms) is no panacea to integrate biodiversity into development cooperation, as narrowly utilitarian framings of biodiversity tend to dominate it, and as biodiversity baseline data are seldom used to inform the mitigation of negative biodiversity impacts (Hugé et al., 2017). Yet impact assessment also allows to transparently identify win-win solutions when possible, and to assess trade-offs between development and conservation when necessary (McShane et al., 2011). Furthermore, impact assessment has been explicitly designed to support decision-making and is aligned, albeit imperfectly, to the iterative cycle of progressing insight that is supposed to underpin development cooperation initiatives.

In practice, biodiversity mainstreaming initiatives show varying degrees of success. Motivational, institutional and means-related (financial, capacity and time constraints) barriers often hamper effective mainstreaming (Karlsson-Vinkhuyzen et al., 2018; Nkiaka and Lovett, 2018). Moreover, biodiversity faces competition from other cross-cutting development priorities. These issues, such as climate change adaptation, may have a higher political salience than biodiversity, although both are closely related (De Roeck et al., 2018). Reframing biodiversity concerns can lead to an increase in political prominence, hence the importance of persuasive narratives and framings in EIA processes and in their subsequent communication to a wider audience (Hugé et al., 2017; Rose et al., 2018). Van de Perre et al. (2018) have recently shown that simplistic assumptions such as generalized co-benefits between carbon storage and maximum biodiversity, are not always backed by evidence, demonstrating the need for targeted actions in favor of both biodiversity and climate adaptation and mitigation.

In order to gain insight in the motivations, challenges and strategies regarding the mainstreaming of biodiversity in development cooperation, this study focuses on recent biodiversity mainstreaming efforts in the Democratic Republic of Congo (DRC). According to the 2016 Human Development Report, the DRC is categorized as a country with low human development. With an HDI of 0.435 (and an inequality-adjusted HDI of 0.297), the DRC occupies the 176th place out of 188 countries and is one of the least developed countries in the world (UNDP, 2016). The three largest providers of bilateral Official Development Assistance (ODA) are the United States of America, the United Kingdom and Belgium (OECD DAC, 2016). The DRC harbours a unique biodiversity, that is severely threatened by logging, climate change, agricultural encroachment, poaching, infrastructural development, unregulated mining and conflict (Butsic *et al.*, 2015). Yet it is still home to an immensely biodiverse range of ecosystems (Inogwabini, 2014). The Congo Basin, as the second largest forest basin in the world, is still less affected by deforestation than the Amazon Basin. It provides a living to around 60 million people in Central Africa and has a strong potential for job creation (CBFP, 2018). The DRC is the second most forested tropical country in the world (after Brazil) with 154 million hectares of forest (FAO, 2011), and holds the largest part of the Congo Basin Rainforest (60 % according to Verbeeck et al., 2011). Yet, the country loses 0.2 % of its forest cover every year (FAO, 2015). Since 1999, the DRC has a National Biodiversity Strategy and Action Plan (NBSAP), which is the principal instrument to implement the CBD at the national level. Coordinated national-level actions have been undertaken to achieve the CBD's 2020 Aichi Biodiversity Targets, but most are not independently reviewed. At the local level though, many institutes (such as the Congolese Institute for Nature Conservation (ICCN)) and individuals have contributed to the realization of the Aichi targets. However, there has been a lack of cooperation between the Ministry of Environment & Sustainable Development with other ministries, stakeholders and local communities, and there is still no efficient national system to monitor and review biodiversity (CBD, 2018).

The general aims of this study are to gain a better understanding of: i. biodiversity mainstreaming in development cooperation in general; ii. biodiversity mainstreaming in a biodiversity-rich developing country such as the DRC. Hence, this study aims:

- To determine the current motivations, obstacles and effectiveness of biodiversity mainstreaming in the DRC; (objective 1)
- To assess the framing, the representation and use of biodiversity in a selection of Environmental Impact Assessments (EIAs) recently conducted in the DRC; (objective 2)

The study uses a combination of i. key informant interviews, and ii. qualitative analysis of reports of EIA (environmental impact assessment) conducted in the DRC.

2. Methods

2.1. Outline of the methodology

We used two different methods. In order to explore the dynamics of biodiversity mainstreaming, we started with interviews, as this method allows to explore a topic through mutual learning between interviewee and interviewer. Interviews also allow the research team to identify issues that may not have been considered initially. Interviews allow to scope the topic of research (Young et al., 2018), and make it possible to probe respondents regarding suggested motivations and obstacles for biodiversity mainstreaming, without presenting the respondent with pre-established opinions or biases. We also performed qualitative content analysis on a set of EIAs, to assess the framing, representation and use of biodiversity in EIAs (objective 2).

2.2. Interviews

2.2.1. Interview structure

The interviews focused on the following components:

i Motivations underlying the mainstreaming of biodiversity in development cooperation;
ii Obstacles to biodiversity mainstreaming (at the donor and recipient side of the partnership);
iii Current and potential effectiveness of biodiversity mainstreaming approaches;

The structure and formulation of the questions was based on the literature, in particular on the work of Mace (2014) and Chan et al. (2016) who propose motivations for biodiversity mainstreaming; and on the work of Miller (2014); Drutschinin et al. (2015) and Karlsson-Vinkhuyzen et al. (2017) regarding the identification of obstacles to biodiversity mainstreaming, and regarding the assessment of current and potential effectiveness of biodiversity mainstreaming efforts. Biodiversity mainstreaming tools were proposed to the respondents, based on the work of Hugé et al. (2017) and Karlsson-Vinkhuyzen et al. (2018).

Each interview was semi-structured (following a fixed set of questions but with ample opportunity to come up with other ideas in an open-ended format) for reasons of comparability and interpretability, and to ensure some flexibility as well. Each interview consisted of 32 questions, among which 7 closed-end questions, 9 Likert-scale questions (involving a score following a pre-established set of possibilities) and 16 open-end questions. The interviews were conducted face-to-face. The interview process followed the methodological guidance proposed by Young et al. (2018).

2.2.2. Interview respondents

The interviews were conducted with respondents, with diverse backgrounds, ranging from academic to governmental and non-governmental organizations, and with at least three years of experience on the biodiversity-development cooperation interface in the DRC. Potential respondents were contacted by e-mail. The pool of potential respondents consisted of resource persons who have been/are involved with the design, application and/or evaluation of development partnerships between Belgian and Congolese organizations (governmental or non-governmental) since 2012. Additional respondents were selected through snowball sampling at the end of each interview by asking the interviewee whether (s)he knew any other potential respondents who met the selection criteria. In total, 10 experts were interviewed. The focus on Belgian-Congolese cooperation is motivated by the fact that the DRC is the single biggest recipient of Belgian Official Development Assistance; that Belgium is the third largest bilateral donor for te DRC (OECD DAC, 2016); and that Belgium has a Law on Development Cooperation which specifically mentions the environment and the sustainable management of natural resources as a priority topic (Moniteur Belge, 2013). At the onset of every interview, participants were informed about the objectives of the study. Moreover their anonymity was guaranteed and their consent was formally requested. Although the number of interviewees is quite low, the specificity of the topic at hand made it difficult to select a high number of potential interviewees. Moreover, the quality of the received responses is more important than the quantity, as the questions are purely qualitative in nature. A posteriori we identified a high level of consensus amongst respondens, hence confirming a saturation curve of added information.

2.2.3. Interview: data analysis

The answers to the closed-end questions (Yes/No and Agree/Disagree) were analyzed using descriptive statistics. A percentage threshold of 75 % was used to determine whether consensus (> 75 % of respondents gave the same answer) was reached or not (following Chu and Hwang, 2008; and Hugé et al., 2010). The Likert-scale of possible answers ranged from 1 to 5. All answers to the 16 open-ended questions were analyzed using the qualitative coding approach used by Rose et al. (2018). For each interview, initial codes (*i.e.* keywords) were manually extracted from the answers data in order to create a coding scheme. Subsequently, similar initial codes were joined to form merged codes (meaning that similar keywords were regrouped based on the similarity of the topic, see Appendix A). From the merged codes, final codes or key themes regarding the integration of biodiversity in Belgian development cooperation in the DRC arose.

2.3. Assessment of biodiversity integration in EIAs

2.3.1. Selection of EIAs

The framing, the representation, and the use of biodiversity in mitigation actions were assessed by focusing on a selection of EIAs from the World Bank database (http://documents.worldbank.org/curated/en/docadvancesearch). We selected all publicly available EIAs performed for World Bank-financed projects in the DRC in the last four years (March 2014 - March 2018) in the agricultural, forestry, fisheries and environmental sectors (as these are the –World Bank pre-defined- activity sectors most directly related to biodiversity). This approach yielded seven EIAs. The World Bank is the only multilateral donor that has a comprehensive EIA database that is freely accessible online (Hugé et al., 2017).

2.3.2. Step 2: detailed EIA analysis

For each selected EIA, the following aspects were analyzed (based on Hugé et al. (2017) and Khera and Kumar (2010)):

- *Inclusion of biodiversity aspects*: mainly described by the positive and negative impact of project activities on biodiversity.
- *Inclusion of biodiversity baseline data and the level of detail*: basic descriptions, ecosystems information, data at a certain taxonomic level (class, family, genus, species…).
- *Use of the biodiversity baseline data in the environmental management plan* (EMP) and/or linkages between the data and prevention/mitigation measures outlined in the EIA.

The identification of the representation of biodiversity in the EIA processes was mainly based on the biodiversity baseline data sections in the EIAs. By qualitatively comparing the environmental management plan sections of each EIA with its biodiversity baseline data section, we collected information about the actual use of EIA data to inform future decision-making.

2.3.3. Step 3: biodiversity framings

With this step, we aimed to identify the dominant biodiversity framing in each EIA. This was done using the existing descriptors reflecting the range of biodiversity framings in the literature (Table 1) and by using Dryzek (2013) approach, which lists the constitutive elements of framing and identified characteristic language and assumptions (regarding biodiversity) to perform the qualitative coding. The main guiding questions were:

- How is biodiversity understood? Which basic concept (scientific entities such as taxa, ecosystems,…) or constructs (domestic animals

etc.) are recognized?
- Which assumptions are made about relationships? (impact, causalities,…)
- Which keywords or metaphors are used to describe biodiversity?

This exercise yielded a list of descriptors (keywords) (Table 1) for each EIA. We subsequently compared these case-specific descriptors with key descriptors of biodiversity framings as drawn from the literature (Holmes et al., 2017; Miller et al., 2011; Mace, 2014; Tallis and Lubchenco, 2014 –which are outlined in Table 1) and we synthesized the results in Table 6.

3. Findings

3.1. Motivations, obstacles, effectiveness and tools for biodiversity integration in development cooperation (interviews)

The results of the Likert scale questions are displayed in Table 2. The underlying motivations for biodiversity mainstreaming show that intrinsic reasons coexist with instrumental reasons. This indicates that the most effective way to convey a biodiversity conservation message varies depending on the target audience and context. The respondents agreed that 'lack of capacity' constituted an obstacle at the Belgian level, as well as the 'lack of political will' at various Congolese government levels). In their perception, a 'lack of harmonization within DRC' and the 'lack of financial commitment' were also major obstacles at the Congolese side. The experts consider the local level of decision-making in DRC as potentially most efficient for the integration of biodiversity (very effective), followed by both the national and the sectoral levels (effective). Currently, the experts find the national budget of DRC to be 'very ineffective' in integrating biodiversity and some claim biodiversity-allocated budgets to be virtually inexistent. For an optimal integration of biodiversity, the respondents indicate that national development strategies, national biodiversity strategies and the national budget could form very effective entry points. The potential role of DRC-specific country strategies of donor countries as biodiversity entry points, remains unclear for the respondents. When investigating how effectively different development sectors in DRC are currently integrating biodiversity, all sectors are deemed by the respondents to score 'ineffective'. Change towards a better integration of biodiversity is deemed most effective in the 'Agriculture', 'Forestry' and 'Energy' sectors. Finally, Payment for Ecosystem Services (PES) and certification schemes are not seen as very promising. EIA is scored as potentially –more- effective in the future, while the broader approaches of capacity-building, regulation and legislation are considered potentially very effective strategies.

The results of the closed-end questions are shown in Table 3. Consensus was reached for 4 out of the 7 questions. The respondents all agreed on the necessity of the integration of biodiversity in development cooperation in DRC. Accordingly, 80 % believed conservation of biodiversity and ecosystem services to be crucial for poverty alleviation in the country. The respondents showed mixed responses to the question on who needs to lead the way in biodiversity mainstreaming, which was seen by most as a shared responsibility between donor (provider) country and recipient (partner) country. Most participants were not familiar with the IPBES, showing the gap between international platforms and biodiversity mainstreaming actions on the ground. However, almost all participants believe this type of platforms could have an impact on biodiversity policy in DRC. All participants agreed that access to existing biodiversity data and EIAs should be improved.

The findings of the open-end questions were analyzed using qualitative content analysis (as in Rose et al., 2018), are synthesized in Table 4 and presented in full Appendix A at the end of this paper.

3.2. Findings of the EIA analysis

Table 5 represents the inclusion of biodiversity in the seven analysed EIAs. The outcomes of Table 5 were synthesized in order to obtain Table 6. The analyzed EIAs build on a wide variety of biodiversity framings. Most of the representations of biodiversity show a low taxonomic resolution, highlighting mostly vernacular names and mostly lacking quantification and assessments of threat and vulnerability levels. Furthermore, only one EIA (EIA 3) had an environmental management plan (EMP) in which biodiversity baseline data were included.

Table 1
Schematic overview of key descriptors for different biodiversity framings derived from scientific literature. Adapted from Hugé et al. (2017).

Biodiversity Framings	Key descriptors	Source
Nature for itself	Species; Wilderness; Protected Areas;	Mace (2014)
Nature despite people	Extinction threats, threatened species; Habitat loss; Pollution; Overexploitation;	Mace (2014)
nature for the people	Ecosystems; Ecosystem services; Economic values;	Mace (2014)
People and nature	Environmental Change; Resilience; Adaptability; Socio-ecological systems	Mace (2014)
Nature protectionists	Protected Areas; Limiting human presence & disturbance; Biodiversity protection as primary goal;	Miller et al. (2011)
SOCIAl conservationists	Sustainable use; Development and welfare-oriented goals; Poverty alleviation and social justice;	Miller et al. (2011)
traditional conservation 2.0	Bio-centric motivation; Conserving ecosystem processes; Biodiversity in pristine areas and in modified landscapes;	Holmes et al. (2017)
Nearly new conservation	Market-based instruments; Strong role of science; Avoid harm to people when protecting biodiversity;	Holmes et al. (2017)
Market skepticism	Benefits for the people are key; Opposes links with capitalism and corporations;	Holmes et al. (2017)
Intrinsic value of nature	Protect nature for its own sake;	Tallis and Lubchenco (2014)
inSTRUMENTAL value of nature	Protect nature for human's sake;	Tallis and Lubchenco (2014)

Table 2
Descriptive statistics of the answers on the Likert scale questions. Scales ranged from 1 (Not important at all; Very ineffective; Not an obstacle-in bold) to 5 (Very important; Very effective; Major obstacle-in bold) with '3' indicating an intermediate answer.

1 Reasons to INTEGRATE biodiversity in DEVELOPMENT COOPERATION?	Mean scores	
		Important
Provisioning ecosystem services	**4,7**	**Very Important**
Supporting ecosystem services	**4,6**	**Very Important**
Regulating ecosystem services	**4,6**	**Very Important**
Cultural values	4,2	Important
2 HOW EFFECTively is biodiversity currently integrated in Belgian development cooperation in the DR CONgo?		
	2,1	Ineffective
3 Obstacles to the integration of biodiversity in development cooperation (at level of the Belgian government)		
Lack of knowledge on the link between biodiversity and development cooperation	3,7	Obstacle
Lack of access to biodiversity baseline data	3,2	Neutral
Lack of biodiversity awareness	3,2	Neutral
Lack of capacity	3,5	Obstacle
Lack of alignment between Belgium and DRC	2,8	Neutral
Lack of harmonization between Belgium and other donor countries	3,1	Neutral
Lack of harmonization within Belgium	3,1	Neutral
Lack of political will	3,9	Obstacle
Geographical spread is too large	3,3	Neutral
Biodiversity is a long-term commitment	2,8	Neutral
Lack of financial commitment (ODA)	4,1	Obstacle
4 Obstacles to the integration of biodiversity in development cooperation (at level of the DRC government)		
Lack of knowledge on the link	3,7	Obstacle
Lack of access to biodiversity baseline data	4,2	Obstacle
Lack of biodiversity awareness	3,3	Neutral
Lack of capacity	4,2	Obstacle
Lack of harmonization within DRC	**4,7**	**Major obstacle**
Lack of political will	4,4	Obstacle
Geographical spread is too large	3,4	Neutral
Biodiversity is a long-term commitment	3,7	Obstacle
Lack of financial commitment	**4,8**	**Major obstacle**
5 Possible effectiveness of different levels of decision-making in DRC		
International	3,4	Neutral
National	4,1	Effective
Local	**4,7**	**Very effective**
Sector	3,9	Effective
6 Current effectiveness of biodiversity entry points in DRC		
National development strategies	2,3	Ineffective
National biodiversity strategies	2,9	Neutral
National budget	**1,3**	**Very ineffective**
Country strategies of donors	2,6	Neutral
7 Potential effectiveness of biodiversity entry points in DRC		
National development strategies	**4,8**	**Very effective**
National biodiversity strategies	**4,8**	**Very effective**
National budget	**4,9**	**Very effective**
Country strategies of donors	3,9	Effective
8 Current effectiveness of development sectors in DRC regarding biodiversity integration		
Agriculture	1,9	Ineffective
Forestry	1,9	Ineffective
Infrastructure	**1,4**	**Very ineffective**
Education	2	Ineffective
Health	1,6	Ineffective
Energy	2	Ineffective
Governance	1,6	Ineffective
Gender	1,6	Ineffective
Communities & human settlements	1,9	Ineffective
Culture	2,1	Ineffective
9 Potential effectiveness of development sectors in DRC regarding biodiversity integration		
Agriculture	**4,7**	**Very effective**
Forestry	**4,8**	**Very effective**
Infrastructure	4	Effective
Education	4,3	Effective
Health	3,6	Effective
Energy	**4,7**	**Very effective**
Governance	4,1	Effective
Gender	3,7	Effective
Communities & human settlements	4,3	Effective
Culture	3,7	Effective
10 Potential effectiveness of biodiversity integration tools in DRC		
Payment for Ecosystem Services	3,4	Neutral
Certification schemes	2,8	Neutral
EIA (with EMP)	3,6	Effective
Capacity building	**4,6**	**Very effective**
Regulation and legislation	**4,7**	**Very effective**

4. Discussion

4.1. The Congolese context & the bigger picture

Given the international importance of the DRC biodiversity and ecosystems, and the breadth of its development challenges, assessing how biodiversity can be integrated in the country's current and future development is a topical and urgent issue. The motivations underlying the integration of biodiversity in development cooperation in the DR Congo are diverse. Both the interview respondents as the analyzed EIAs tend to combine different narratives to call for biodiversity integration. The EIAs do not always exhibit a strong dominance of instrumental, utilitarian motivations. While this may be due to the relatively small sample of studied EIAs, it hints at differences between the overwhelmingly utilitarian framings of biodiversity that were identified by Hugé et al. (2017) in EIAs conducted in West-Africa. Discussions on the most compelling framing of biodiversity are held at the global level (Borie and Hulme, 2015) and at the national and local level (Rose et al., 2018), and are subject to change. However, the direct dependence of many Congolese on functional ecosystems providing a steady range of benefits, means that one would expect an essentially instrumental framing of biodiversity 'for human development'. However our findings suggest that motivations for mainstreaming biodiversity are less unequivocally utilitarian than one might expect. Indeed some of the analyzed EIAs reflect a 'nature for itself' framing, while the respondents similarly find the intrinsic value of nature important. This may mean that there is no need to frame biodiversity in a merely utilitarian way in order to make people act –intrinsic value and a sense of international responsibility may actually be widely shared. The diversity of views underpinning the mainstreaming of biodiversity in development cooperation can be positive – as it allows a wider range of strategies than the mere 'commodification of nature' to work. However, governance challenges threaten the effectiveness of any biodiversity-action in the DR Congo.

Governance efficiency remains a challenge to systematically mainstream biodiversity issues in development policies and projects in the DRC, ranging from the enduring geo-political instability to the unsupervised, non-transparent and fragmented resource extraction strategies (Butsic et al., 2015; UNEP, 2011). This situation makes it difficult to harmonize priorities regarding biodiversity integration between the DRC and providing countries, and hampers the systematic application of biodiversity mainstreaming tools that require a long-term commitment. Similarly, while the interviews allowed us to identify which sectors are considered the most effective to focus on in terms of biodiversity action (agriculture, forestry, energy), these perceptions ideally need to be confronted to the realities on the ground (what about the actual effectiveness?). Brandt et al. (2016) for example, highlight the ineffective sustainable forest management practices in the DRC, while Samndong et al. (2018) pinpoint the complex system of statutory and customary land tenure which makes REDD+ (Reduced Emissions from Deforestation and Forest Degradation)

Table 3
Answers to the Yes (Agree) and No (Disagree) questions. Consensus was reached when the same answer was given by > 75 % of the respondents.

closeD-end question	Yes	No	Consensus?
1 Do you agree with the statement that conservation and sustainable use of biodiversity are intrinsically linked to development cooperation?	7	3	No
2 Do you believe that it is necessary for biodiversity to be integrated in development cooperation in the DRC?	10	0	Yes (100%)
3 Do you agree with the following statement: conservation of biodiversity (and ecosystem services) is crucial to ensure poverty alleviation in the DRC?	8	2	Yes (80%)
4 In the context of the Belgium-DRC cooperation, do you agree with the following statement: 'Donor organizations/countries lead the way to biodiversity integration in development cooperation.'?	4	5	No
5 Are you familiar with IPBES?	3	6	No
6 Do you believe such platforms (as IPBES) can have an impact on biodiversity policy in the DRC?	8	1	Yes (89%)
7 EIAs performed in World Bank projects are freely accessible online. It is however harder to gain access to project reports of bilateral, multilateral, non-governmental or private organizations. Do you agree that project databases and therefore their EIAs should be more transparent?	9	0	Yes (100%)

less effective. Policies aiming at multiple-use forest management exist (Nasi et al., 2012), though one-size-fits-all solutions such as state-owned reserves, are not necessarily the most effective solution to protect and sustainably manage the DRC biodiversity (Inogwabini, 2014). The multiplicity of challenges to sustainable forest and biodiversity management such as the lack of inter-ministerial coordination, competing commercial interests and inadequate land use policy -which does not prioritize development in less biodiverse areas- continues to drive deforestation and forest degradation in the Congo Basin (Tegegne et al., 2016).

4.2. Limitations of EIA as a biodiversity-mainstreaming tool

As most scholars and practitioners agree that specific, 'one-issue' biodiversity impact assessments (contrasted with multidimensional environmental impact assessments, which include water, air, soil *etc.*) are probably not the most effective tool to mainstream biodiversity (*e.g.* Roe and Geneletti, 2016), the inclusion of biodiversity in existing, multi-dimensional environmental impact assessment processes is essential. Despite the existing guidance at the international level (*e.g.* OECD-DAC, 1992; SIDA, 1998; CBD, 2016); and despite experience with biodiversity mainstreaming by way of EIAs in many countries, the practice still shows mixed results in the sector of development cooperation. Even within an international organization such as the World Bank, the inclusion of biodiversity (including its framing, its representation, the quality of its baseline data and its inclusion in the mitigation measures of the EMPs) remains poor. Translating the high-level biodiversity conservation commitments (CBD, Sustainable Development Goals...) into action requires linking biodiversity data to decision-making, for which EIAs are one of the essential instruments. The generation of EIAs with compulsory inclusion of biodiversity would force parties and stakeholders to consider most negative side-effects from the onset of programmes and projects. This could be a safeguard against the spirit of *post hoc* remediation after the damage is done, in crisis management mode, as is too often the case. However, our study shows that biodiversity concerns and data that are included in EIAs in the DRC, most probably do not achieve an impact at the decision-making level. EIAs hence remain a mostly theoretical exercise. This is a missed opportunity, as EIAs typically propose and include biodiversity indicators, which are crucial to measure the change in biodiversity over time (Rochette et al., 2019). Reflecting on biodiversity framings, collecting data and developing indicators is essential, yet, in the EIAs studied, these components typically fail to get included in the mitigation measures that an EIA is supposed to propose. Efforts by the Congolese and their development partners are needed to strengthen the linkages between biodiversity data and decision-making – this can happen through EIA indeed (King et al., 2012), yet needs to be seen in the bigger picture of

Table 4
Synthesis of the qualitative content analysis of the open-ended questions of the interviews (see Appendix A for full results).

Component of the questionnaire	Key issues emerging from the interviews
Integration of biodiversity in development cooperation: general	Importance of link between biodiversity and development cooperation not widespread
	Negative impacts of development cooperation on biodiversity exist
	Link biodiversity & climate change
	Biodiversity needs to be fostered, also without development cooperation
	Priority on livelihoods
Integration of biodiversity in development cooperation: DRCongo context	Links and tradeoffs between development and biodiversity in DRC
	Lack of theoretical and practical knowledge
	Lack of effective implementation
	Alignment of Belgium and DRC priorities not evident
	Slowly arising harmonization (between donors and within Belgium)
	Lack of and/or misuse of financial resources and capacities (individuals and institutional support)
	Need for more access to/and or new approaches for biodiversity baseline data
	Geographical scale and political status of DRC make commitments harder
	Long-term *vs.* short-term solutions
Responsibilities and knowledge-sharing	Decentralization needed in DRC, yet all decision-making levels are important
	Development cooperation agencies
	Prioritization effort of Belgian government
	Weak alignment between Belgium and DRC
	DRC ownership
	All national strategies should include a biodiversity entry point (transversal approach of strategies)
	Monitoring of budgets rather than setting penalties
	Education and awareness raising
	Importance of different sectors
	Scientific knowledge and capacity
	IPBES
	Biodiversity integration outside of development cooperation
Biodiversity integration tools	Lack of the use of integration tools in DRC
	Reasons for the lack of use of integration tools in DRC
	Integration of biodiversity in project documents
	(list of mentioned) biodiversity integration tools
	Combination of biodiversity integration tools

Table 5
Biodiversity-relevant characteristics of the analysed EIAs.

EIA number	TOPicS/SECTORS	Considered biodiversity aspects	quality and level of baseline data in the eia	use of baseline data in the emp[1]
EIA 1	Agroforestry and Forest management		> Mention of present vegetation types > Mention of some present plant habitus (e.g. herbaceous plants) > Mention of some animal species (Bonobo, Elephant, Buffalo) (own observation: only iconic species are mentioned)	> No biological data in the EMP > Reforestation, no information of the type of tree > Mention by participants of need to replant aquatic species (not included in EMP *sensu stricto*)
EIA 2	Agricultural rehabilitation	> Objective: assure conservation of basic natural resources, mainly through conservation of aquatic biodiversity > Positive impacts: reduction of pressure on plant resources and improvement of poor soils > Negative impacts: damage to trees and other vegetation (especially riparian vegetation), damage to faunal habitats > Proposed mitigation measures: clearly define cutting zones, physically separate activities from vegetation, minimize disturbance, restore disrupted land, establish and maintain faunal habitat buffer zones, forbid activities in protected areas, awareness raising	> Mention of forest categories > Mention of penetrating savannah species (species-level) > Tree vegetation: number of exploitable tree species mentioned (250), 7 are specified to species-level (local importance) > Low taxonomic resolution of faunal data ('*monkeys, elephants, river pigs, rodents, crocodiles, hippopotamuses, fish…*') > Map with ecosystem types > Map with priority conservation zones and protected areas	> No biological data in the EMP > Proposed mitigation measures set as monitoring indicators
EIA 3	Agricultural Growth	> Negative impacts: possible impact to biodiversity of fauna and flora, possible introduction of GMOs, possible water pollution (damage to habitat) > Positive impacts: less pressure on plant resources, less lake fish exploitation, risk of water pollution, protection against soil erosion, less pressure on large forests, preservation and protection of biodiversity > Support to ICCN and partners > Preservation of protected areas > integrated and sustainable management of fish resources > Risk of exploiting fish juveniles mentioned > Creation of buffer zones between agricultural zones and protected areas could lighten the pressure on protected areas	> Map with protected areas > Mention of forest categories > Description of protected areas > Table with deforestation rates in the area > Low taxonomic resolution of faunal data	> Put in place extra protection measures in protected areas, Preservation of protected species (not specified) > Surveillance of deforestation activities > Reforestation and plantations (no species specified)
EIA 4	Forest Investment Program	> Positive impacts: awareness raising on conservation of ecosystems, of ecosystem services and biodiversity in a community context, relief of pressure on forest resources, restoration of forest landscapes > Negative impacts: deforestation due to demand of agricultural growth, pressure on forest resources (fuel wood), habitat destruction due to reforestation and agroforestry, rodent habitat destruction, decrease of vegetation cover, gradual impoverishment of soils > Objective: sustainable management of natural resources > Mitigation measures include restoration of the vegetation cover, enrichment of forest with autochthone species, increase of forests' primary productivity	> Mention of vegetation types > Low taxonomic resolution of faunal baseline data, e.g.. Reptiles, herbivores, carnivores… > Mention of protected areas in DRC (+map) > Process of creation of protected areas described (as done by ICCN)	> No link between baseline section and EMP
EIA 5	National REDD + Strategy	> Focus on sustainable management of forests > Potential negative impacts: risk of habitat loss, loss of biodiversity due to replacement of primary forest by pasture or monocultures, accelerated forest degradation and deforestation, simplification of natural ecosystems, proliferation of animal pests, loss of local forest products	> Mention of main national vegetation types > Fauna: mention of 3 species (Okapi, Bonobo and Mountain gorilla) (own observation: iconic species) > Poaching and fishing are major threats for biodiversity	> No EMP present

(*continued on next page*)

Table 5 (*continued*)

EIA number	TOPICS/SECTORS	Considered biodiversity aspects	quality and level of baseline data in the eia	use of baseline data in the emp[1]
EIA 6	National Park Rehabilitation	> Positive Impacts: mainly reduction of environmental issues (poaching, deforestation, pollution or destruction of water sources) > Negative impacts: mostly related to construction works, type of materials used and management of waste and polluting materials > Negative perception of local community towards conservation of biodiversity. > Fish, wood and hunting prey seen as main resources for local community. > Main objectives: protection of fauna and flora, valorisation of biodiversity by scientific research, sustainable management of biodiversity > Nature of the project entails activities that will promote the local environment (and biodiversity).	> Vegetation types, some genera mentioned > Mention of some fauna species (White rhinoceros (possibly disappeared), Giraffe, Elephant, Buffalo, Eastern gorilla, Chimpanzee…) (own observation: iconic species) > Low taxonomic resolution of faunal baseline data (*e.g.* 'birds')	> No biodiversity data in the EMP
EIA 7	Forest management	> Positive impacts: preservation of the forest, protection of aquatic environments, conservation of biodiversity > Negative impacts: habitat destruction, soil erosion > Non-specified negative impacts on biodiversity due to agricultural production, plantation of energy wood forests, construction of bridges and road rehabilitation	> Vegetation types mentioned per zone > Mention of some fauna species (Bonobo, Elephant and Buffalo)	> Negative impacts of the project attenuated by several actions: restauration of marginalized vegetative cover, enrichment of the forest with native plant species and increase of the forest's primary productivity

[1] **EMP:** Environmental Management Plan.

monitoring, reporting and verification too (Vanhove et al., 2017). Despite the account of 'under-performing' EIA practice in the DRC the respondents agree that EIA has the potential to be an effective biodiversity mainstreaming tool. Biodiversity data may still be fragmented in DRC, but initiatives, such as the Consortium Congo 2010, have successfully generated and disseminated biodiversity data (CSB, 2014). Moreover, as the intrinsic value of biodiversity is apparently recognized in the studied EIAs, there is fertile ground for more EIAs to be conducted. In a spirit of dialogue, alignment and harmonization, donor and recipient countries should work towards an enhanced integration of biodiversity in EIAs.

EIA is not sufficient to mainstream biodiversity in development actions in the DRC, but neither is it an artificial approach. With uneven, yet often high-quality output, the outcomes are still under-performing because of a range of contextual factors, such as a lack of enforcement, a lack of EIA understanding and uptake by decision-makers, a slowly improving but still pervasive lack of biodiversity data, and an enduring governance conundrum.

4.3. Limitations of the present study

This study aims to shed a light on an under-studied topic, the expectations and practice of EIA in the DRC. As the study is based on a relatively limited number of respondents and case studies, it provides an exploration of the topic rather than a comprehensive overview. Some questions may reflect a bias by the research team, although care was taken to formulate all questions in a neutral way. Moreover, with hindsight, it may have been preferable to provide the respondents the opportunity to tick a 'no opinion' answer in the Likert-scale questionnaire. Given the dynamic and ultimately political nature of the use and implementation of biodiversity mainstreaming in development cooperation, readers should be aware that the findings of this study are not cast in stone, and are subject to changing –political- circumstances, *e.g.* regarding the political prominence of biodiversity and development cooperation.

5. Conclusion

There is no panacea for biodiversity mainstreaming in development cooperation. Based on the interviews conducted in this study, the most effective approaches to mainstream biodiversity depend on the framings which underpin the preservation of biodiversity (framings that were shown to go beyond the merely utilitarian one in the DRC in our EIA-analysis); on the local governance context (*incl.* the involvement of diverse stakeholders; the collaboration between ministries, and the availability of robust data); and on the willingness and capabilities of the recipient country and its providing partners to achieve common goals in agreement with national and international commitments.

The global importance of the Congo Basin's biodiversity and the direct dependence of many Congolese on a diverse range of ecosystem services make it urgent to improve biodiversity mainstreaming. EIA is an approach to foster biodiversity conservation and human development, as it allows to move beyond the paralyzing gridlock of a narrow 'nature despite people'-framing. Policies for biodiversity conservation do not need to impose constraints on development *per se*, as shown by the diversity of framings fostered in the analyzed EIAs and by the support for EIA expressed by the interview respondents. These findings are of direct relevance to Congolese policies and programmes, such as the ambitious DRC National Biodiversity Strategy & Action Plan (NBSAP).

The lack of robust, attributable outcomes of –cumulative- EIA experience in the DRC is due to: i. *extrinsic factors* (outside EIAs), such as the lack of a conducive institutional framework which would allow inclusive, data-driven, transparent and enforced governance practices; and to: ii. *intrinsic factors* (inside EIAs), such as the lack of clear linkages between the biodiversity baseline data in the EIA and the eventual mitigation measures proposed by the EIA, and the non-standardized biodiversity data collection. We recommend future research lines on i. the interplay between EIA and other decision-support processes; ii. the potential customization and

Table 6
Schematic overview of the framing and representation of biodiversity in analysed EIAs. Table 5 is a synthesis of Table 4. The link between biodiversity baseline data provided in the EIA and the environmental management plan (EMP) is indicated with "-": no link, "+": link.

EIA Number	Biodiversity Framing	Representation of biodiversity	Decision-making context
EIA 1	> Intrinsic Value/Nature for itself: iconic species > Instrumental value/Nature for people/Social conservationist: sustainable use of ecosystem services	> Vegetation types and forest categories > Species-level for some fauna	–
EIA 2	> Intrinsic Value/Nature for itself: species > Nature protectionist/Nature despite people: habitat loss, limiting human disturbance	> Vegetation types and forest categories > General names for fauna > Type of ecosystems present	–
EIA 3	> Intrinsic Value/Nature for itself: species, protected areas > Instrumental value/Nature for people/Social conservationist: sustainable use of ecosystem services (plant and fish resources) > Nature protectionist: protected areas, surveillance	> Map with protected areas > Mention of forest categories > Description of protected areas > Table with deforestation rates in the area > General names for fauna	+
EIA 4	> Nature protectionist/Nature despite people: habitat loss, surveillance, protected areas, overexploitation > Instrumental value/Nature for people/Social conservationist: sustainable use of natural resources	> Mention of vegetation types > Low resolution of faunal baseline data, e.g. reptiles, herbivores, carnivores… > Process of creation of protected areas described (as done by the Congolese Institute for Conservation of Nature (ICCN)) > Mention of protected areas in DRC (+map)	–
EIA 5	> Instrumental value/Nature for people/Social conservationist: sustainable use of natural resources	> Mention of main national vegetation types > Fauna: mention of 3 iconic species > Poaching and fishing are major threats for biodiversity	–
EIA 6	> Intrinsic Value/Nature for itself: species, protected areas > Instrumental value/Nature for people/Social conservationist: sustainable use of natural resources	> Vegetation types, some genera mentioned > Mention of some fauna species (> General names for fauna (like 'birds')	–
EIA 7	> Instrumental value/Nature for people/Social conservationist: sustainable use of natural resources > Intrinsic Value/Nature for itself: species, protected areas	> Vegetation types mentioned per zone > Mention of some fauna species	–

adaptation of EIA practice to the Congolese context; and iii. the types of data and data-sharing platforms that could maximize uptake of biodiversity information by decision-makers at different decision-making levels.

EIAs do provide an opportunity to translate biodiversity data into relevant decision-making support, if the EIA processes show the flexibility in framing biodiversity in the most compelling way, if the collected biodiversity data are sufficiently structured, accessible, high-quality and if those data are actually used when proposing alternatives that can mitigate the potential negative impacts on biodiversity.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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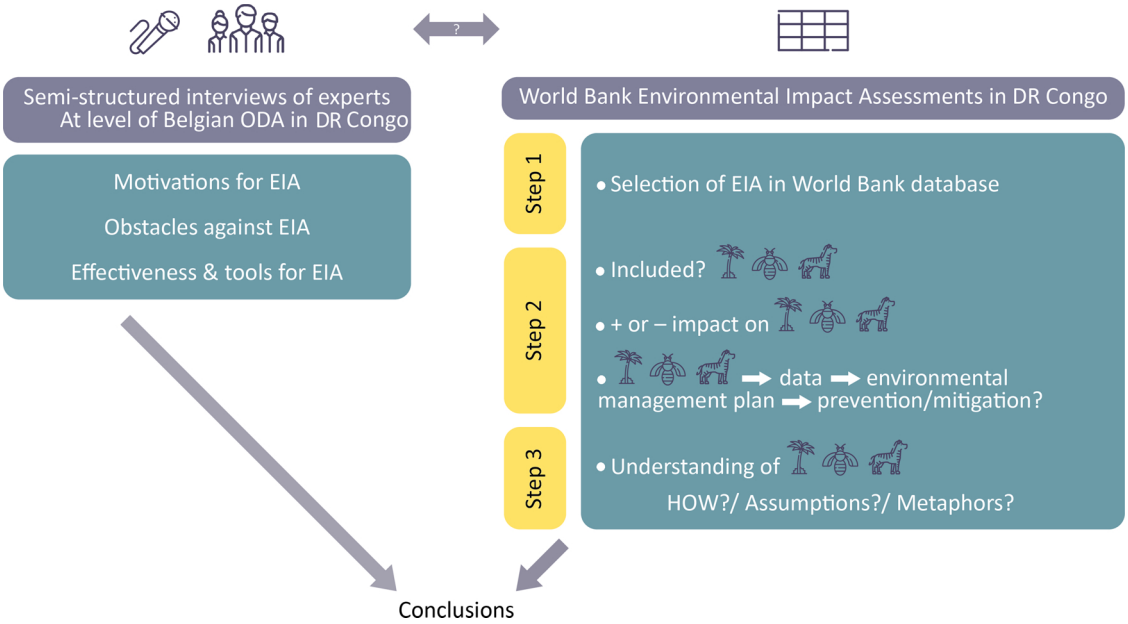

Fig. 1. Outline of the methodology of this study.

Appendix A

Table A1

Table A1
Coding document resulting from Qualitative Content Analysis of the open-end questions of the interviews. The following words were abbreviated in the 'initial code' section: Biodiversity (BD), Development (D) and Development Cooperation (DC). The total number of times a code was mentioned during the interviews is indicated under '#'. The approach followed is inspired by Rose et al. (2018).

INITIAL CODE	#	MERGED CODES	#	FINAL CODES/KEY THEMES	#
1 **Integration of biodiversity in development cooperation: General**					
Theoretically, BD and DC are linked	6	Importance of link between biodiversity and development cooperation not widespread	14	**Importance of link between biodiversity and development cooperation not widespread**	**14**
No awareness on the link between BD and D	5				
To a certain scale, DC without BD is possible	3				
Currently, DC abuses BD	3	Negative impact of development cooperation	6	**Negative aspects of development cooperation**	**7**
Trade-offs exist between BD and DC	2				
Need for more knowledge on BD thresholds	1				
DC lacks long-term view that BD management needs	1	Development cooperation lacks long-term frame	1		
BD is linked to other environmental topics such as climate change	10	Biodiversity and climate change are linked	10	**Link biodiversity and climate change**	**22**
Addressing climate change means addressing BD loss and *vice versa*	6	Biodiversity conservation necessary to address climate change	12		
Part of climate change solution lies in sustainable BD management	4				
Without B, less carbon is sequestered	2				
DRC needs to carry on its own D with BD integration	1	Biodiversity conservation without development cooperation	1	**Biodiversity conservation without development cooperation**	**1**
Conserving BD is not the end goal, providing proper livelihood is	1	Livelihood as a priority	1	**Livelihoods as priority**	**1**
2 **Integration of biodiversity in development cooperation: the DRC**					
DRC population relies on natural resources for livelihood	4	Recognition of link between biodiversity and poverty alleviation in DRC	10	**Links and tradeoffs between development and biodiversity in DRC**	**12**
BD is important but not crucial for poverty alleviation	3				
BD is the ecological basis on which you can build D	1				
Poverty will increase if biodiversity is lost	1				
Direct link between DRC population well-being and the DRC forests	1				
Tradeoffs exist between economic D and BD conservation	1	Negative impact of development on biodiversity	2		
Local paradigm: forests need to be cut for D	1				
Belgian and DRC stakeholders not sufficiently informed of BD and D link	4	Lack of theoretical and practical knowledge on biodiversity integration	5	**Lack of theoretical and practical knowledge**	**6**
Lack of knowledge on how to practically BD	1				
Need collaboration between technical research and social science	1	Need for collaboration from different fields			
Awareness and actions exist on donor side but not sufficiently	2	Lack of projects/stakeholders efficiently implementing biodiversity integration	5	**Lack of efficient implementation of biodiversity integration**	**5**
BD integrating projects exist, but implementation lacks	1				
Type of projects not always suited for BD integration	1				
CEBIOS & WWF are the only players in Belgium integrating B in DRC cooperation	1				
Belgium lacks alignment to DRC due to western approach	1	Alignment between Belgium and DRC not evident	2	**Alignment between Belgium and DRC not evident**	**2**
Degree of alignment between Belgium and DRC is organization-dependent	1				
Efforts for harmonization between Belgium and other donor countries are slowly arising	2	Slowly arising harmonization efforts (between donors and within Belgium)	6	**Slowly arising harmonization efforts (between donors and within Belgium)**	**6**
Dialogues between Belgium and other donor countries are not sufficiently implemented	1				
Need for more collaboration between donors	1				

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Table A1 (*continued*)

INITIAL CODE	#	MERGED CODES	#	FINAL CODES/KEY THEMES	#
Efforts for harmonization within Belgium are slowly arising	2				
ODA for BD insufficient	3	ODA nor government investment are sufficient or correctly earmarked	12	**Lack of and/or misuse of financial resources and capacities (individuals and institutional support)**	**19**
ODA should not be allocated to BD specifically, transversal approach necessary	1				
ODA for Belgian development cooperation in DRC insufficient	3				
ODA mostly productivity-oriented	1				
No financial investment from DRC government	4				
Benefits of DRC's ecosystems not sufficiently used on the international market	1				
Wrongly spend budgets (Belgium and DRC) due to lack of capacity	2	Lack or misuse of capacities (capacities in the form of individuals and institutional support)	7		
Lack of capacity (Belgium and DRC)	4				
Some capacity (Belgium and DRC) but not used properly	1				
Available BD baseline data is too basic (taxonomic approach rather than ecosystem approach)	1	Biodiversity data needs ecosystem approach	1	**Need for more access to/and or new approaches for biodiversity baseline data**	**5**
Baseline data exists but are not consulted/accessible enough	2	Biodiversity data not accessible enough	4		
Many baseline data remains from colonial period but is not easily accessible	2				
Large geographical scale is an obstacle, but should not be	5	Large scale of DRC is a practical problem	6	**Geographical scale and political status of DRC makes commitments harder**	**9**
Specific strategies needed to tackle large scale problems	1				
Weak governance of DRC	2	Country instability	3		
Weak country stability limits long-term commitments	1				
Some BD conservation achievements are possible at short-term	1	Short- *vs*. Long-term solutions	3	**Short- *vs*. Long-term solutions**	**3**
Need for long-term vision of both governments	2				
3 **Responsibilities and knowledge-sharing**					
All decision-making levels of DRC are equally important for the integration of BD	2	Decentralization needed in DRC, yet all decision-making levels are important	6	**Decentralization needed in DRC, yet all decision-making levels are important**	**6**
Need for decentralization on BD-related governance	4				
BD is only one among many other transversal themes for the Belgian government	1	Prioritization efforts of the Belgian government	2	**Prioritization efforts of Belgian government**	**2**
Efforts are slowly arising from Belgium government on implementing EIAs in DRC	1				
Effectiveness of different development cooperation agencies active in DRC differs strongly	4	Development cooperation agencies differ in biodiversity integration effectiveness	4	**Development cooperation agencies**	**4**
Current alignment between DRC and Belgium is weak	4	Weak alignment between Belgium and DRC	8	**Weak alignment between Belgium and DRC**	**8**
Belgium tries to align with DRC but fails to in practice	2				
Alignment regarding biodiversity is not a priority, other social problems are omnipresent	2				
Currently, donor organizations lead the way to BD integration	3	DRC ownership	24	**DRC ownership**	**24**
Donor countries should not lead the way	7				
DRC needs to form own strategies	5				
Own strategies need to be monitored properly	4				
Need for personnel and capacity regarding strategies	4				
Little political appropriation	1				
All types of strategies should have entry points for BD	3	All national strategies should include a biodiversity entry point (transversal approach of strategies)	8	**All national strategies should include a biodiversity entry point (transversal approach of strategies)**	**8**
All strategies are important, but national D strategies form key entry points	1				
Private sectors should also include BD in their strategies	1				
National strategies form basis for other strategies and budgets	2				
Most DRC strategies of donor countries are weak in terms of BD integration	1				

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Table A1 (*continued*)

INITIAL CODE	#	MERGED CODES	#	FINAL CODES/KEY THEMES	#
Conditionality penalties of Belgium to DRC do not work	6	Monitoring of budgets rather than setting penalties	8	**Monitoring of budgets rather than setting penalties**	**8**
Need for better control of Belgian ODA to DRC through own implementing agencies	2				
Lack of interconnectedness of sectors	2	Importance of different sectors	6	**Importance of different sectors**	**6**
All sectors are equally important for the integration of BD	2				
Agriculture and forestry are priority sectors for BD integration	2				
Need for awareness raising in schools, at all levels of education	4	Education and awareness raising	7	**Education and awareness raising**	**7**
Integration of BD in schools is important, but not a priority	1				
Need for awareness raising of all possible actors in DRC	2				
Scientific knowledge not sufficiently developed	3	Need for scientific knowledge and capacity	8	**Scientific knowledge and capacity**	**10**
Need for know-how on collecting and interpreting data	1				
Need for scientific personnel and capacity	4				
Scientific knowledge needs to be vulgarized (for all possible stakeholders)	2	Need for vulgarization of scientific knowledge	2		
Platforms like IPBES can help the DRC government to implement international agreements	1	IPBES platform	2	**IPBES platform**	**2**
The extent to which IPBES can influence DRC remains doubtful	1				
BD should be integrated in all possible sectors (not only development cooperation)	5	Biodiversity integration outside of development cooperation	5	**Biodiversity integration outside of development cooperation**	**5**
4 **Biodiversity integration tools**					
Lack of implemented BD integration tools in DRC	3	Lack of the use of integration tools in DRC	3	**Lack of the use of integration tools in DRC**	**3**
Lack of awareness regarding BD integration tools	1	Lack of awareness regarding biodiversity integration tools	4	**Reasons for lack of the use of integration tools in DRC**	**9**
Lack of priorities	3				
Lack of diffusion of scientific information	2	Lack of scientific info to support tools	5		
Lack of free accessibility of already existing BD data	2				
Lack of mobilization of 'grey data'	1				
BD should systematically be integrated in project proposals	1	Integration of biodiversity in project documents	9	**Integration of biodiversity in project documents**	**9**
Need for more transparency of project documents and EIAs	8				
Payment for Ecosystem Services (PES) don't always reach their rightful owner	2	PES as an Integration tool	6	**Biodiversity integration tools**	**24**
PES might never work in the context of DRC	2				
PES lacks sustainability and strict supervision	1				
PES needs to be accompanied by other tools	1				
Impact of certification schemes is too small-scaled	4	Certification schemes as an integration tool	5		
Certification schemes lack effect locally	1				
EIAs are currently the best integrated tool	1	EIA as an integration tool	4		
EIAs should be used more	1				
EIAs can be a guideline, but do not form the key of success	1				
EIA only works with implementation	1				
BD specific impact assessment	1	Possible tools and approaches for integration of biodiversity in development cooperation	9		
Protected areas in most vulnerable and BD-rich areas	1				
International markets (eg. Carbon market)	1				
Rentability (monetary value) of biodiversity	1				
Awareness raising	2				
Education	2				
Klimos tool (Environmental sustainability toolkit)	1				
A combination of tools would be most efficient for the integration of BD	4	Combination of biodiversity integration tools	4	**Combination of biodiversity integration tools**	**4**

References

Adenle, A., Stevens, C., Bridgewater, P., 2015. Global conservation and management of biodiversity in developing countries: an opportunity for a new approach. Environ. Sci. Policy 45, 104–108.

Biggs, R., Kizito, F., Adjonou, K., Ahmed, M.T., Blanchard, R., Coetzer, K., Handa, C.O., Dickens, C., Hamann, M., O'Farrell, P., Kellner, K., Reyers, B., Matose, F., Omar, K., Sonkoue, J.-F., Terer, T., Vanhove, M., Sitas, N., Abrahams, B., Lazarova, T., Pereira, L., 2018. Chapter 5: current and future interactions between nature and society. *In* IPBES In: Archer, E., Dziba, L., Mulongoy, K.J., Maoela, M.A., Walters, M. (Eds.), The IPBES Regional Assessment Report on Biodiversity and Ecosystem Services for Africa. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany, pp. 297–352.

Borie, M., Hulme, M., 2015. Framing global biodiversity: IPBES between mother earth and ecosystem services. Environ. Sci. Policy 54, 487–496.

Brandt, J.S., Nolte, C., Agrawal, A., 2016. Deforestation and timber production in Congo after implementation of sustainable forest management. Land Use Policy 52, 15–22.

Butsic, V., Baumann, M., Shortland, A., Walker, S., Kuemmerle, T., 2015. Conservation and conflict in the Democratic Republic of Congo: the impacts of warfare, mining and protected areas on deforestation. Biol. Conserv. 191, 266–273.

Cardinale, B.J., Duffy, E., Gonzalez, A., Hooper, D.U., Perrings, C., Venail, P., Narwani, A., Mace, G.M., Tilman, D., Wardle, D.A., Kinzig, A.P., Daily, G.C., Loreau, M., Grace, J.B., Larigauderie, A., Srivastava, D., Naeem, S., 2012. Biodiversity loss and its impact on humanity. Nature 486, 59–67.

CBD [Convention on Biological Diversity], 2018. Democratic Republic of the Congo - Country Profile. Retrieved from https://www.cbd.int/countries/profile/default.shtml?country=cd#facts, last Accessed on May 15th 2019. .

CBFP, 2018. Congo Basin Forest Partnership. last Accessed June 9th, 2019. https://pfbc-cbfp.org/home.html.

Chan, K.M., Balvanera, P., Benessaiah, K., Chapman, M., Diaz, S., Gomez-Baggethun, E., Gould, R., Hannah, N., Jax, K., Klain, S., Luck, G.W., Martin-Lopez, B., Muraca, B., Norton, B., Ott, K., Pascualo, U., Satterfield, T., Tadaki, M., Taggart, J., Turner, N., 2016. Why protect nature? PNAS 113 (6), 1462–1465.

Chu, H.C., Hwang, G.J., 2008. A Delphi-based approach to developing expert systems with the cooperation of multiple experts. Expert Syst. Appl. 34, 2826–2840.

CSB, 2014. Etat Des Lieux De La Biodiversité Dans Le RD Congo. Centre De Surveillance De La Biodiversité. last Accessed June 9th, 2019. http://cd.chm-cbd.net/implementation/docs/monographie/reports_rapports-1-copy-copy.pdf.

Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S.J., Kubiszewski, I., Farber, S., Turner, S.K., 2014. Changes in the global value of ecosystem services. Glob. Environ. Chang. 26, 152–158.

De Roeck, F., Orbie, J., Delputte, S., 2018. Mainstreaming climate change adaptation into the European Union's development assistance. Environ. Sci. Policy 81, 36–45.

Diaz, et al., 2018. Assessing nature's contribution to people. Science 359, 271–272.

Di Marco, M., Chapman, S., Althor, G., Kearney, S., Besancon, C., Butt, N., Maina, J.M., Possingham, H.P., Rogalla von Bieberstein, K., Venter, O., Watson, E.M., 2017. Changing trends and persisting biases in three decades of conservation science. Glob. Ecol. Conserv. 10, 32–42.

Drutschinin, A., Casado-Asensio, J., Corfee-Morlot, J., Roe, D., 2015. Biodiversity and development Co-operation. OECD Development Cooperation Working Papers N°21. OECD Publishing, Paris.

Dryzek, J.S., 2013. The Politics of the Earth: Environmental Discourses. Oxford University Press, Oxford, UK.

Egoh, B.N., O'Farrell, P.J., Charef, A., Gurney, L.J., Koellner, T., Nibam Abi, H., Egoh, M., Willemen, L., 2012. An African account of ecosystem service provision: use, threats and policy options for sustainable livelihoods. Ecosyst. Serv. 2, 71–82.

FAO, 2011. The State of Forests in the Amazon Basin, Congo Basin and Southeast Asia. A Report Prepared for the Summit of the Three Rainforest Basins. Brazzaville, Republic of Congo. http://www.fao.org/3/i2247e/i2247e00.pdf, last Accessed June 9th, 2019. .

FAO [Food and Agriculture Organization], 2015. Global Forest Resources Assessment 2015: How Are the World's Forests Changing? UNFAO, Rome.

Holmes, G., Sandbrook, C., Fisher, J., 2017. Understanding conservationists' perspectives on the new conservation debate. Conserv. Biol. 31, 353–363.

Hugé, J., Le Trinh, H., Hai, P.H., Kuilman, J., Hens, L., 2010. Sustainability indicators for clean development mechanism projects in Vietnam. Environ. Dev. Sustain. 12 (4), 561–571.

Hugé, J., Rochette, A.J., Janssens de Bisthoven, L., Dahdouh-Guebas, F., Koedam, N., Vanhove, M., 2017. Utilitarian framings of biodiversity shape environmental impact assessment in development cooperation. Environ. Sci. Policy 75, 91–102.

IAIA, 2015. International Association for Impact Assessment. Last Accessed October 20, 2019. www.iaia.org.

Inogwabini, B.I., 2014. Conserving Biodiversity in the Democratic Republic of Congo: a Brief History, Current Trends and Insights for the Future. Parks 20.2.

IPBES, 2018. The Regional Assessment Report on Biodiversity & Ecosystem Services for Africa. Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services.

Karlsson-Vinkhuyzen, S., Kok, M.T.J., Visseren-Hamakers, I.J., Termeer, C.J.A.M., 2017. Mainstreaming biodiversity in economic sectors: an analytical framework. Biol. Conserv. 210, 145–156.

Karlsson-Vinkhuyzen, S., Boelee, E., Cools, J., van Hoofd, L., Hospes, O., Kok, M., Peerlings, J., van Tatenhove, J., Termeer, C.J.A.M., Visseren-Hamakers, I.J., 2018. Identifying barriers and levers of biodiversity mainstreaming in four cases of transnational governance of land and water Environ. Sci. Policy 85, 132–140.

Khera, M., Kumar, A., 2010. Inclusion of biodiversity in environmental impact assessments (EIA): a case study of selected EIA reports in India. Impact Assess. & Project Apprais. 28, 189–200.

King, N., Rajvanshi, A., Willoughby, S., Roberts, R., Mathur, V.B., Cadman, M., Chavan, V., 2012. Improving access to biodiversity data for, and from, EIAs – a data publishing framework built to global standards. Impact Assess. & Project Apprais. 30, 148–156.

Kok, M., Metz, B., Verhagen, J., Van Rooijen, S., 2008. Integrating development and climate policies: national and international benefits. Clim. Policy 8, 103–118.

Mace, G., 2014. Whose conservation? Science 345, 1558–1560.

Martin-Lopez, B., Montes, C., 2015. Restoring the human capacity for conserving biodiversity: a social-ecological approach. Sustain. Sci. 10, 699–706.

McShane, T.O., Hirsch, P.D., Trung, T.C., Songorwa, A.N., Kinzig, A., Monteferri, B., Mutekanga, D., Thang, H.V., Dammert, J.L., Pulgar-Vidal, M., Welch-Devine, M., Brosius, P., Coppolillo, P., O'Connor, S., 2011. Hard choices: making trade-offs between biodiversity conservation and human well-being. Biol. Cons. 144, 966–972.

Miller, T.R., Minteer, B.A., Malan, L.C., 2011. The new conservation debate: the view from practical ethics. Biol. Cons. 144, 948–957.

Miller, D.C., 2014. Explaining global patterns of international aid for linked biodiversity conservation and development. World Dev. 59, 341–359.

Moniteur Belge, 2013. Development Cooperation Law (in French & in Dutch - *Loi Relative à La Cooperation Au Développement*). March 19, 2013. https://diplomatie.belgium.be/sites/default/files/downloads/Wet_Belgische_Ontwikkelingssamenwerking_19%20maart_2013.pdf, last Accessed June 9th, 2019. .

Nasi, R., Billand, A., van Vliet, N., 2012. Managing for timber and biodiversity in the Congo Basin. For. Ecol. Manage. 268, 103–111.

Nkiaka, E., Lovett, J.C., 2018. Mainstreaming climate adaptation into sectoral policies in central Africa: insights from Cameroun. Environ. Sci. Policy 89, 49–58.

OECD DAC, 1992. Guidelines on Aid and Environment N° 1. Good Practices for Environmental Impact Assessment of Development Projects. Last Accessed January 2nd, 2019. http://www.oecd.org/dac/environment-development/1887592.pdf.

OECD, 2012. OECD Environmental Outlook to 2050: The Consequences of Inaction. OECD Publishing, Paris. https://doi.org/10.1787/9789264111318-en.

OECD DAC, 2016. Aid at a Glance Charts. Last Accessed October 20, 2019. https://www.oecd.org/countries/democraticrepublicofthecongo/aid-at-a-glance.htm.

Persson, A., 2009. Environmental policy integration and bilateral development assistance: challenges and opportunities with an evolving governance framework. Int. Environ. Agreem. 9, 409–429.

Pires, A.P.F., Amaral, A.G., Padgurschi, M.C.G., Joly, C.A., Scarano, F.R., 2018. Biodiversity research still falls short of creating links with ecosystem services and human well-being in a global hotspot. Ecosyst. Serv. 34, 68–73.

Rochette, A.J., Akpona, J.D., Akpona, H.A., Akouehou, G.S., Mayundo Kwezi, B., Djagou, C.A.M.S., Habonimana, B., Idohou, R., Legba, I.S., Nzigidahera, B., Matilo, A.O., Taleb, M.S., Bamoninga, B.T., Ivory, S., Janssens de Bisthoven, L., Vanhove, M.P.M., 2019. Developing policy-relevant biodiversity indicators: lessons learnt from case studies in Africa. Environ. Res. Lett. 14, 035002.

Roe, D., Mohammed, E.Y., Porras, I., Giuliani, A., 2013. Linking biodiversity conservation and poverty reduction: de-polarizing the conservation-poverty debate. Conserv. Lett. 6, 162–171.

Roe, D., Geneletti, D., 2016. Addressing the interactions between biodiversity conservation and poverty alleviation in impact assessment. In: Geneletti, D. (Ed.), Handbook on Biodiversity and Ecosystem Services in Impact Assessment. Edward Elgar Publishing, Cheltenham, UK & Northampton, USA.

Rose, D.C., Brotherton, P.N.M., Owens, S., Pryke, T., 2018. Honest advocacy for nature: presenting a persuasive narrative for conservation. Biodivers. Conserv. 27, 1703–1723.

Samndong, R.A., Bush, G., Vatn, A., Chapman, N., 2018. Institutional analysis of causes of deforestation in REDD+ pilot sites in the Equateur Province: implications for REDD + in the Democratic Republic of Congo. Land Use Policy 76, 664–674.

SIDA, 1998. Guidelines for Environmental Impact Assessment in Development Cooperation. Swedish International Development Cooperation Agency, Stockholm, Sweden.

Steffen, W., Richardson, K., Rockstrom, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., Sörlin, S., 2015. Guiding human development on a crowded planet. Science 347 (6223).

Suich, H., Howe, C., Mace, G., 2015. Ecosystem services and poverty alleviation: a review of the empirical links. Ecosyst. Serv. 12, 137–147.

Tallis, H., Lubchenco, J., 2014. Working together: a call for inclusive conservation. Nature 515, 27–28.

Tallis, H., Kennedy, C.M., Ruckelshaus, M., Goldstein, J., Kiesecker, J.M., 2015. Mitigation for one & all: an integrated framework for mitigation of development impacts on biodiversity and ecosystem services. Environ. Impact Assess. Rev. 55, 21–34.

Tegegne, Y.T., Lindner, M., Fobissie, K., Kanninen, M., 2016. Evolution of drivers of deforestation and forest degradation in the Congo Basin: exploring possible policy options to address forest loss. Land Use Policy 51, 312–324.

UN ECOSOC, 2015. In: Alonso, A., Glennie, J. (Eds.), *What is development cooperation?* Development Cooperation Forum Policy Brief February 2015. N° 1, Last Accessed June 5th, 2019. https://www.un.org/ecosoc/sites/www.un.org.ecosoc/files/publications/what_is_development_cooperation.pdf.

UNEP, 2011. The Democratic Republic of the Congo – Post-conflict Environmental Assessment – Synthesis for Policy-makers. United Nations Environment Program.

UNDP, 2016. Human Development Report 2016: Human Development for Everyone. New York, USA. .

Van de Perre, F., Willig, M.R., Presley, S.J., Bapeamoni Andemwana, F., Beeckman, H., Pascal Boeckx, P., Cooleman, S., de Haan, M., De Kesel, A., Dessein, S., Grootaert, P., Huygens, D., Janssens, S.B., Kearsley, E., Mutombo Kabeya, P., Leponce, M., Van den Broeck, D., Verbeeck, H., Würsten, B., Leirs, H., Verheyen, E., 2018. Reconciling biodiversity and carbon stock conservation in a Afrotropical forest landscape. Sci. Adv. 4, eaar6603.

Vanhove, M.P.M., Rochette, A.J., Janssens de Bisthoven, L., 2017. Joining science & policy in capacity development for monitoring progress towards the Aichi Biodiversity Targets in the global South. Ecol. Indic. 73, 694–697.

Verbeeck, H., Boeckx, P., Steppe, K., 2011. Tropical forests: include Congo Basin. Nature 479, 179.

Verissimo, D., MacMillan, D.C., Smith, R.H., Crees, J., Davies, Z.G., 2014. Has climate change taken prominence over biodiversity conservation? BioScience 64, 625–629.

Young, J.C., Rose, D.C., Mumby, H.S., Benitez-Capistros, F., Derrick, C.J., Finch, T., Parkinson, S., 2018. A methodological guide to using and reporting on interviews in conservation science research. Methods Ecol. Evol. 9 (1), 10–19.