IAIA21

VIRTUAL EVENT

#iaia21

Assessing mining impacts on native vegetation

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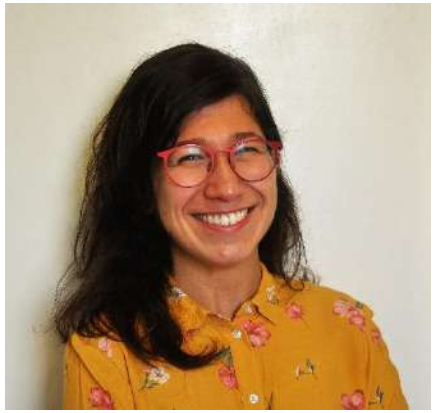

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Agenda

1. Introduction
2. Research question & objective
3. Methods
4. Analysis
5. Conclusions

Introduction

Introduction

- Mining **directly** impact native vegetation by clearing **inside leases** and **indirectly** when requires **additional infrastructure** (Lechner et al. 2017)

- These impacts **interact over space and time** leading to **cumulative impacts** on native vegetation, affecting kilometers far from leases (Sonter et al 2017; Siqueira-Gay et al 2020)

- The cumulative loss of native vegetation may be a source of secondary impacts on **biodiversity and ecosystem services** (Siqueira-Gay and Sánchez 2020)

- Best pratice recognize the importance of assessing these cumulative impacts (IFC, 2013; World bank, 2019)

- However little is known about the actual **application** of available guidance and even less about their **actual outcomes**, especially **considering the cumulative impacts on native vegetation in mining regions**

Research question & objective

Research question

How are the cumulative impacts on native vegetation currently addressed by Environmental and Social Impact Assessements (ESIAs) of mining projects?

Objetive

This research aims at understanding **how the cumulative impacts on native vegetation** are currently addressed by ESIAs of mining projects

Methods

General methodology

- Case study analysis
- Data collection method: document review
- Data analysis: collect evidences using checklist based on international guidance and scientific literature

Main steps

- (i) selection **cases studies** on IFC website with available complete documentation from **2013 until 2019**;
- (ii) elaboration of a **review package** based on literature review;
- (iii) **document review** based on the proposed review checklist

Case study selection

- The criteria applied for case studies selection:

(i) project of the **mining** sector

(ii) **availability** of documents on IFC website

(iii) present **PS6** in the list of applicable standards (Biodiversity Conservation and Sustainable Management of Living Natural Resources)

Project name	Location	Date of ESIA	PS (IFC)	Project type
Aurora Gold	Guyana	July, 2013	1,2,3,4,6	Exploration and development of gold deposits
Guinea Alumina Corporation	Guinea	October, 2017	1,2,3,4,5,6, 8	Bauxite mine and associated rail, port and marine infrastructure

Case studies review

- Case studies review aims at investigating **general aspects** of mining studies and present some specific inquiries about **how these studies address the cumulative impacts on native vegetation**

Review checklist

- **Review package** made by Lee et al. (1999)enriched with **specific criteria** on **biodiversity** and **cumulative impacts** drawn from the literature(Cooper et al. 2004; IFC 2013; Dibo et al. 2018; Veronez and Montaño 2018)

- Lee et al. (1999) proposed **seven main criteria** for classifying information provided in environmental reports

Symbol	Explanation	Color code
A	Generally well performed, no important tasks left incomplete	
B	Generally satisfactory and complete, only minor omissions and inadequacies	
C	Can be considered just satisfactory, despite omissions and/or inadequacies	
D	Parts are well attempted but must, as a whole, can be considered just unsatisfactory because of omissions or inadequacies	
E	Not satisfactory, significant omissions or inadequacies	
F	Very unsatisfactory, important task(s) poorly done or not attempted	
NA	Not applicable. The review topic is not applicable, or it is irrelevant in the context of this environmental appraisal report	

1. Project description

1.1. Are the objectives of the project clearly stated?*

1.2. Are the size of the project and the area of influence described?*

1.3. Are the operation described?*

1.4. Is the environmental legislation clearly described?*

2. Alternatives assessment

2.1 Methods

2.1.1. Is the method used clearly explained?*

2.1.2 Are the effects of each alternative described?*

2.2. Alternatives selection

2.2.1. Are the reason aligned with location strategies and land use types?*

2.2.2. Is the alternative of "no project" consider?**

2.2.3. Are technological alternatives presented?****

2.2.4. Is the avoidance criteria used in the project design?****

2.2.5. Is the avoidance criteria used through the site selection?****

2.2.6. Is the innovative options used considering the avoidance?****

2.2.7. Is the minimization component used in the alternatives selection?****

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), * (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)**

3. Affected Environment

3.1. Description of affected environment

3.1.1. Are the areas affected described (by narrative description and/or map)?*

3.1.2. Are the types of habitats affected described?***

3.1.3. Are the critical or sensible habitats described in detail? (PS6) ****,******

3.1.4. Are the trends and factors of historical degradation identified? ***

3.1.5. There is ecosystem services assessment? (PS6) ******

3.2. Data and methods

3.2.1 Are the sources of data used clearly stated? **

3.2.2. Is the methodology for primary data collection described? **

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), * (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)**

4. Identification and evaluation of key impacts

4.1. Description of impact

4.1.1. Is the screening clearly described and justified? *

4.1.2. Are the direct and indirect impacts described? *

4.1.3. Are the residual impacts described? *

4.1.4. Are the avoided impacts mentioned in any part of project assessment? ****

4.1.5. Is the fragmentation identified as impact? ****

4.1.6. Is the habitat loss identified as impact? ****

4.2. Evaluation methods

4.2.1. Is the general methodology cleary described? *

4.2.2. Are participatory methods were used? *

4.3. Magnitude

4.3.1. Is the impact magnitude predicted, either in quantitative or qualitative terms? *

4.3.2. Are the methods clearly described?*

4.3.3. Are the criteria clearly justified?*

4.4. Significance

4.4.1. Are the criteria for evaluation justified?*

4.4.2. Is the duration of the impact consider?*

4.4.3. Is fragmentation considered as significative impact?*

4.4.4. Is habitat loss considered as significative impact?****

4.4.5. Are the residual impacts evaluated?****

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), * (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)**

5. Cumulative impacts

5.1. Other related projects, programs and plans

5.1.1. Are other projects in the area decribed (by narrative description and/or map)?**

5.1.2. Are other related programs described?**

5.1.3. Are other related plans described?**

5.1.4. Are the relation between other plans and programs and the project clearly described?**

5.2. Valued Environmental and Social Components (VECs) selection

5.2.1. Are the native vegetation and/or critical habitat selected as affected VEC?******

5.2.2. Is the scoping of VEC selection clearly stated?******

5.2.3. Is the VECs identified in consultation with affected communities and stakeholders? ******

5.2.4. Is the temporal scale of analysis for each VEC justified? ******

5.2.5. Is the spatial scale of analysis for each VEC justified? ******

5.2.6. Are the spatial scale based on ecological boundaries ? *****

5.2.7. Are the indicator species, endangerment or conservation status used in the VEC's selection?****

5.2.8. Are natural and social stressors affecting VEC identified and described?******

5.2.9. Is the present condition of VEC described?******

5.3. Magnitude

5.3.1. Is the impact magnitude predicted, either in quantitative or qualitative terms?

5.3.2. Are the criteria clearly justified?*

5.4. Significance

5.4.1. Are the criteria for evaluation justified?*

5.4.2. Are the pathways described?***

3.4.3. Is the interaction between impact considered? ***

3.4.4. Is fragmentation considered as significative cumulative impact?****

3.4.5. Is habitat loss considered as significative cumulative impact?***

5.5. Cumulative residual impacts

5.5.1. Is the cumulative effects of residual impacts described and evaluated?*****

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), *** (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)

6. Mitigation and monitoring

6.1. Mitigation measures

6.1.1. Are the strategies, plans and procedures to manage all identified impacts clearly described and justified? ******

6.1.2. Are monitoring indicators for all identified impacts described and justified? ******

6.1.3. Are the strategies, plans and procedures to manage the cumulative impacts proposed? ******

6.1.5. Are measured to avoid impacts proposed? ******

6.1.6. Are measured to minimize impacts proposed? ******

6.1.7. Are measures to restore impacts proposed? ******

6.1.8. Are offsets for biodiveristy and ecosystem services proposed? ******

6.2. "No net loss"

6.2.1. Is there any consideration of loss in terms of biodiversity and ecosystem services?****

6.2.2. Is there any consideration of gains in terms of biodiversity and ecosystem services?****

6.3. Monitoring

6.3.1. Are indicators (ecological and others) proposed for the project follow up?*

6.3.2. Are actions to minimize the impacts during all projects phases?*

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), * (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)**

7. Communication of results

7.1. Layout

7.1.1. Is the information logically arranged in section and chapters?*

7.1.2. Are chapter and other sections of the report, unless very short, present summaries outlining their main findings and conclusions?*

7.1.3. Are external sources cited?*

7.1.4. Are maps and figure with good resolution?*

7.2. Presentation

7.2.1. Is the information presented comprehensible for all audiences?*

7.2.2. Is obscure language avoided? Acronyms and initials should be defined*

7.3. Uncertainties

7.3.1. Are uncertainties and other limitations regarding information, data and methodologies acknowledged?*

7.3.2. Uncertainties and limitations have been handled within the environmental appraisal are explained and justified?*

7.4. Consultation

7.4.1. Were audiences of public consultation developed for the project appraisal?

7.4.2. Are the opinions they expressed summarised and taken into account in the Report?*

References: *(Lee et al., 1999), **(Veronez and Montaño, 2018), * (Cooper, 2004), ****(Treweek, 1999), ****(Ekstrom et al., 2015), *****(Dibo et al., 2018), ******(IFC, 2013)**

Analysis

Aurora Gold

- Guyana

The main components of the Aurora Gold project include:

(i) the **Aurora mine** site
(ii) the **logistics support facility**;
(iii) a **road extension**;
(iv) a **new access road**

Documents details

- Two ESIAs: original and updated

	Updated ESIA (Environ)	**Original ESIA (ERM)**
Number of pages	421	421
Number of chapters	15	12
Number of appendixes	13	0
Number of annexes	4	4
Identified applicable PS (IFC)	1,2,3,4,6	

Project description	1.1.	1.2.	1.3.	1.4.										
	A	B	A	B										
Alternatives assessment	Methods		Alternatives selection											
	2.1.1.	2.1.2.	2.2.1.	2.2.2.	2.2.3.	2.2.4.	2.2.5.	2.2.6.	2.2.7.					
	D	D	B	F	C	B	A	A	B					
Affected environment	Description of affected environment					Data and methods								
	3.1.1.	3.1.2.	3.1.3.	3.1.4.	3.1.5.	3.2.1.	3.2.2.							
	B	A	A	A	D	A	A							
Identification and evaluation of key impacts	Description of impact						Evaluation methods							
	4.1.1.	4.1.2.	4.1.3.	4.1.4.	4.1.5.	4.1.6.	4.2.1.	4.2.2.						
	B	E	A	A	F	A	B	F						
	Magnitude			Significance										
	4.3.1.	4.3.2.	4.3.3.	4.4.1.	4.4.2.	4.4.3.	4.4.4.	4.4.5.						
	A	B	B	B	A	F	A	C						
Cumulative impacts	Other related projects, programs and plans				VECs selection									
	5.1.1.	5.1.2.	5.1.3.	5.1.4.	5.2.1.	5.2.2.	5.2.3.	5.2.4.	5.2.5.	5.2.6.	5.2.7.	5.2.8.	5.2.9.	
	A	A	A	B	A	F	F	F	B	F	F	A	A	
	Magnitude		Significance				Cumulative residual impacts							
	5.3.1.	5.3.2.	5.4.1.	5.4.2.	5.4.3.	5.4.4.	5.4.5.	5.5.1.						
	A	B	C	F	F	F	A	F						
Mitigation and monitoring	Mitigation measures							No net loss		Monitoring				
	6.1.1.	6.1.2.	6.1.3.	6.1.5.	6.1.6.	6.1.7.	6.1.8.	6.2.1.	6.2.2.	6.3.1.	6.3.2.			
	A	F	A	C	B	B	C	D	D	F	A			
Results communication	Layout				Presentation		Uncertainties		Consultation					
	7.1.1.	7.1.2.	7.1.3.	7.1.4.	7.2.1.	7.2.2.	7.3.1.	7.3.2.	7.4.1.	7.4.2.				
	A	A	A	B	A	A	F	F	B	F				

- "Cumulative impacts" section is the lowest ranked with 43% of the criteria with the lowest grade (F)
- "Affected environment" is the well ranked section with 71% of (A) and no (F)

- No critical habitats were identified under the project influence

- The alternatives assessment was mainly:

(i) consider **technological alternatives for energy production**

(ii) **avoidance** of clearing native vegetation in the road's projects and general infrastructure

(iii) There is no consideration of **"no project"** alternative

- Valued Environmental and Social Components (VEC) selection was not clearly described

- the **spatial scale** of VECs analysis is not clearly **described** and it is **not based on ecological boundaries**;

- **the temporal scale is not defined**

- there is no documented public participation in the VECs selection

Guinea Alumina Corporation

- Guinea
- The main project comprises:

(i) bauxite mine, including access roads, explosive storage, bauxite crushing plant, ore stockpile and other facilities;
(ii) port;
(iii) marine infrastructure

- The associated infrastructure includes a railway and a port terminal

Documents details

- 3 ESIAs:

(i) mine and port;
(ii) railway
(iii) dam

	ESIA mine and port				**ESIA Rail**	**ESIA Dam**
	Volume 1	**Volume 2**	**Volume 3**	**Volume 4**	**Volume 1**	**Volume 1**
Number of pages	943	571	284	709	550	590
Number of chapters	9	7	2	1	14	12
Number of appendixes	0				0	0
Number of annexes	0			14	1	11

Mine and port area

Project description	1.1.	1.2.	1.3.	1.4.										
	A	C	A	A										
Alternatives assessment	Methods		Alternatives selection											
	2.1.1.	2.1.2.	2.2.1.	2.2.2.	2.2.3.	2.2.4.	2.2.5.	2.2.6.	2.2.7.					
	A	C	C	F	B	E	E	B	B					
Affected environment	Description of affected environment					Data and methods								
	3.1.1.	3.1.2.	3.1.3.	3.1.4.	3.1.5.	3.2.1.	3.2.2.							
	A	B	A	B	A	A	A							
Identification and evaluation of key impacts	Description of impact						Evaluation methods							
	4.1.1.	4.1.2.	4.1.3.	4.1.4.	4.1.5.	4.1.6.	4.2.1.	4.2.2.						
	C	A	A	C	A	A	C	B						
	Magnitude			Significance										
	4.3.1.	4.3.2.	4.3.3.	4.4.1.	4.4.2.	4.4.3.	4.4.4.	4.4.5.						
	A	B	B	B	B	A	A	A						
Cumulative impacts	Other related projects, programs and plans				VECs selection									
	5.1.1.	5.1.2.	5.1.3.	5.1.4.	5.2.1.	5.2.2.	5.2.3.	5.2.4.	5.2.5.	5.2.6.	5.2.7.	5.2.8.	5.2.9.	
	C	B	B	C	C	E	E	C	E	C	B	B	B	
	Magnitude		Significance					Cumulative residual impacts						
	5.3.1.	5.3.2.	5.4.1.	5.4.2.	5.4.3.	5.4.4.	5.4.5.	5.5.1.						
	F	F	F	F	F	B	A	F						
Mitigation and monitoring	Mitigation measures							No net loss		Monitoring				
	6.1.1.	6.1.2.	6.1.3.	6.1.5.	6.1.6.	6.1.7.	6.1.8.	6.2.1.	6.2.2.	6.3.1.	6.3.2.			
	A	A	B	B	A	A	B	A	A	B	C			
Results communication	Layout				Presentation		Uncertainties		Consultation					
	7.1.1.	7.1.2.	7.1.3.	7.1.4.	7.2.1.	7.2.2.	7.3.1.	7.3.2.	7.4.1.	7.4.2.				
	A	B	A	A	A	A	B	C	B	B				

- "Cumulative impacts" section is the lowest ranked with 42% of the criteria with the lowest grade (F)
- The "affected environment","indentification and evaluation of key impacts" and "mitigation and monitoring" are the sections well ranked without the lowest grade

- The “no project” alternative is not considered
- Analysis of **critical habitats** is presented
- Presents **fragmentation** of habitats for **chimpanzee and red colobus** as impacts
- Impacts **significance** is determined using **magnitude and sensitivity**
- **VECs temporal and spatial boundaries are not** clearly **presented**
- **Cumulative impacts on vegetation and chimpanzees are presented**
- Impacts of **“edge effects” on native vegetation** are of **minor** importance

Rail

Project description	1.1.	1.2.	1.3.	1.4.										
	A	A	A	A										
Alternatives assessment	Methods		Alternatives selection											
	2.1.1.	2.1.2.	2.2.1.	2.2.2.	2.2.3.	2.2.4.	2.2.5.	2.2.6.	2.2.7.					
	B	C	C	F	F	B	B	C	B					
Affected environment	Description of affected environment					Data and methods								
	3.1.1.	3.1.2.	3.1.3.	3.1.4.	3.1.5.	3.2.1.	3.2.2.							
	A	A	A	B	A	A	A							
Identification and evaluation of key impacts	Description of impact						Evaluation methods							
	4.1.1.	4.1.2.	4.1.3.	4.1.4.	4.1.5.	4.1.6.	4.2.1.	4.2.2.						
	C	B	A	B	A	A	B	B						
	Magnitude			Significance										
	4.3.1.	4.3.2.	4.3.3.	4.4.1.	4.4.2.	4.4.3.	4.4.4.	4.4.5.						
	B	C	B	B	B	F	F	A						
Cumulative impacts	Other related projects, programs and plans				VECs selection									
	5.1.1.	5.1.2.	5.1.3.	5.1.4.	5.2.1.	5.2.2.	5.2.3.	5.2.4.	5.2.5.	5.2.6.	5.2.7.	5.2.8.	5.2.9.	
	C	B	B	C	A	B	E	E	E	E	F	B	B	
	Magnitude		Significance					Cumulative residual impacts						
	5.3.1.	5.3.2.	5.4.1.	5.4.2.	5.4.3.	5.4.4.	5.4.5.	5.5.1.						
	B	C	C	F	F	B	B	B						
Mitigation and monitoring	Mitigation measures							No net loss		Monitoring				
	6.1.1.	6.1.2.	6.1.3.	6.1.5.	6.1.6.	6.1.7.	6.1.8.	6.2.1.	6.2.2.	6.3.1.	6.3.2.			
	A	B	B	B	B	B	B	F	F	B	B			
Results communication	Layout				Presentation		Uncertainties		Consultation					
	7.1.1.	7.1.2.	7.1.3.	7.1.4.	7.2.1.	7.2.2.	7.3.1.	7.3.2.	7.4.1.	7.4.2.				
	A	C	A	A	A	A	E	E	B	F				

- "Cumulative impacts" section is the lowest ranked with 38% of the criteria with lower grades (F and E)
- The "affected environment" is the only section without the lowest grade

- No mention of **alternative road design** and **no map** is presented with the **impacted vegetation**

- The **preferred alternative** of rail transport mention **avoidance in Key Biodiversity Areas of Kamsar** (port region)

- **The impact of degradation of natural habitats and impacts on biodiversity** are recognized as **relevant**

- **Fragmentation** is mentioned as an impact resulted from habitats destruction but classified as **negligible** because the area is **already fragmented by human occupation**

- There is **no mention** to **VECs spatial and temporal boundaries**

Dam

Project description	1.1.	1.2.	1.3.	1.4.										
	A	B	A	A										
Alternatives assessment	Methods		Alternatives selection											
	2.1.1.	2.1.2.	2.2.1.	2.2.2.	2.2.3.	2.2.4.	2.2.5.	2.2.6.	2.2.7.					
	E	E	C	F	F	F	C	F	C					
Affected environment	Description of affected environment					Data and methods								
	3.1.1.	3.1.2.	3.1.3.	3.1.4.	3.1.5.	3.2.1.	3.2.2.							
	A	A	A	B	A	A	A							
Identification and evaluation of key impacts	Description of impact						Evaluation methods							
	4.1.1.	4.1.2.	4.1.3.	4.1.4.	4.1.5.	4.1.6.	4.2.1.	4.2.2.						
	B	A	A	B	A	A	B	F						
	Magnitude			Significance										
	4.3.1.	4.3.2.	4.3.3.	4.4.1.	4.4.2.	4.4.3.	4.4.4.	4.4.5.						
	B	B	C	B	B	B	A	A						
Cumulative impacts	Other related projects, programs and plans				VECs selection									
	5.1.1.	5.1.2.	5.1.3.	5.1.4.	5.2.1.	5.2.2.	5.2.3.	5.2.4.	5.2.5.	5.2.6.	5.2.7.	5.2.8.	5.2.9.	
	B	C	C	C	F	F	E	F	F	F	F	F	F	
	Magnitude		Significance					Cumulative residual impacts						
	5.3.1.	5.3.2.	5.4.1.	5.4.2.	5.4.3.	5.4.4.	5.4.5.	5.5.1.						
	F	F	F	E	F	F	F	F						
Mitigation and monitoring	Mitigation measures							No net loss		Monitoring				
	6.1.1.	6.1.2.	6.1.3.	6.1.5.	6.1.6.	6.1.7.	6.1.8.	6.2.1.	6.2.2.	6.3.1.	6.3.2.			
	A	A	F	A	A	A	F	F	F	A	A			
Results communication	Layout				Presentation		Uncertainties		Consultation					
	7.1.1.	7.1.2.	7.1.3.	7.1.4.	7.2.1.	7.2.2.	7.3.1.	7.3.2.	7.4.1.	7.4.2.				
	A	B	A	C	A	A	B	E	A	B				

- "Cumulative impacts" section is the lowest ranked with 80% of the criteria with lower grades (F and E)
- The "affected environment" and "identification and evaluation of key impacts" is the only section without the lowest grade

- The description of the **avoided chimpanzees habitat** is mentioned as a criterion in the **project alternatives**

- **Habitat loss** is considered **moderate or minor** depending on the **type of habitat** considered

- **Habitat fragmentation** is identified as impact but evaluated as **insignificant**

- The **social cumulative impacts** are described in the chapter of **social impact assessment**, where **"mining activities"** are presented as "cumulative impact"

- **No assessment of cumulative loss of habitats** is presented

Conclusions

- We found a **lack of approaches** to capture both the **cumulative impacts on native vegetation and fragmentation**

- Despite the importance of habitat loss and fragmentation to biodiversity conservation and no net loss policies, **integrative approaches considering landscape effects are overlooked** in the reviewed cases studies

- **Environmental and social performance** during project construction, operation and decommissioning could be **impaired due to shortcomings in the assessment phase**

Some opportunities for improvement were identified:

(i) integrative assessment between project components and other infrastructures considering the **interaction of impacts** and **further effects in the landscape**

(ii) explicit inform the criteria for **VEC selection** and justify the **boundaries** of assessment

(iii) proper consideration and evaluation of **cumulative residual impacts**

(iv) improving the consideration of critical habitat assessment into impact evaluation considering cumulative impacts in critical habitats

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Let's continue the conversation!

Post questions and comments via chat in the IAIA21 platform.

IAIA21
VIRTUAL EVENT

#iaia21

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