Governance of the extractive industries in the face of climate change in Africa: what impacts can we expect?

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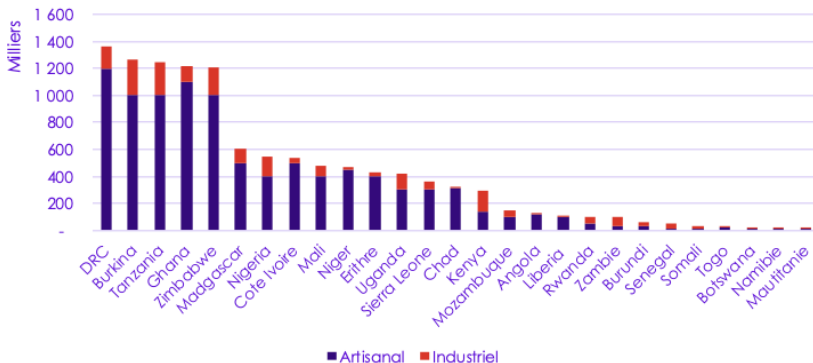
Social and economic context of the extractive sector

- With 30% of the world's oil, gas and mineral reserves, Africa is a major contributor to the energy transition process.

- About 3.5 billion people live in resource-rich countries, and some 69% of them live in poverty [Dobbs et al., 2013]

- Extractive industries plays a strong economic role in 63 countries, many of which face challenges of resource dependency and weak governance (World Bank, 2021).

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Social and economic context of the extractive sector

Figure 1: Industrial vs. artisanal mining employment (thousands))

■ Artisanal ■ Industriel

Social and economic context of the extractive sector

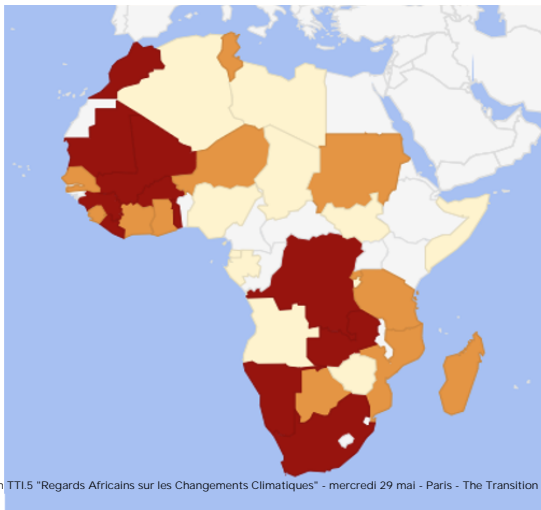Figure 2: Mining exports as a percentage of GDP (2015-2020)
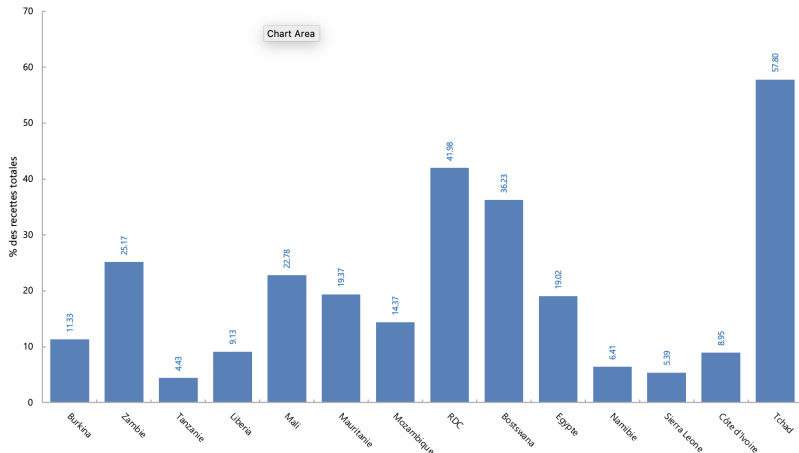

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Social and economic context of the extractive sector

Figure 3: Average contribution in terms of revenue (2010-2020)

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The environmental impact of mining

- If Tropical Deforestation were a Country, it Would Rank Third in CO2e Emissions [Seymour and Busch, 2016].

- Extractive industries come at a cost that is no longer limited to the "natural resource curse" but also includes greenhouse gas emissions, pollution, and biodiversity losses.

- Extractive industries and associated infrastructure are among the main causes of deforestation and emissions [Bebbington et al., 2018].

- Mineral and gas rents contribute to accelerating forest cover loss. In contrast, oil rents and governments' resource revenues contribute to reducing forest cover loss [Kinda and Thiombiano, 2021].

- Analysis of the dynamic effect on a panel of 52 resource-rich countries (including 23 African countries) over the period 2001–2017.

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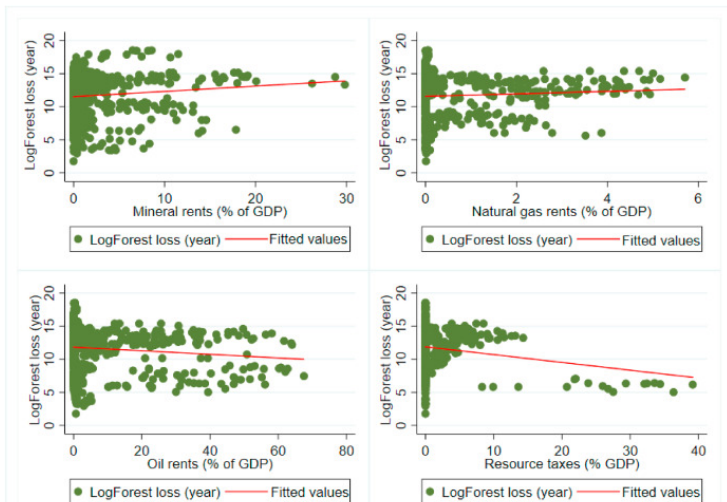
The environmental impact of mining

Figure 4: Extractive resource rents, resources tax revenue, and forest cover loss

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The environmental impact of mining
Identification strategy: GMM-SYS

Table 1: Estimated impact of extractive rents on deforestation

Dependent variable: log forest loss						
	(1)	(2)	(3)	(4)	(5)	(6)
Log forest loss (-1)	0.712***	0.611***	0.625***	0.534***	0.557***	0.628***
	(0.0554)	(0.0710)	(0.0688)	(0.0775)	(0.0827)	(0.0809)
Log total rents	0.225***	0.342***	0.328***	0.328***	0.299*	0.133**
	(0.0767)	(0.123)	(0.126)	(0.124)	(0.153)	(0.0529)
GDP per capita growth		-0.161***	-0.157***	-0.148***	-0.141***	0.0657*
		(0.0420)	(0.0417)	(0.0414)	(0.0415)	(0.0346)
Population growth			-0.148**	-0.174*	-0.124	0.293*
			(0.0753)	(0.0934)	(0.0863)	(0.153)
Log rainfall shocks				0.0126***	0.0124***	0.0099***
				(0.00297)	(0.00313)	(0.00289)
Log NET ODA per capita					-0.285***	-0.331***
					(0.0962)	(0.121)
Log internal conflict						0.302
						(0.594)
Constant	3.028***	4.643***	4.715***	4.511***	5.111***	3.212**
	(0.596)	(0.843)	(0.852)	(0.812)	(0.960)	(1.423)
Nb. of observations	748	747	747	747	715	582
Hansen (p-value)	0.067	0.872	0.798	0.881	0.423	0.932
AR (1) p-value	0.000	0.042	0.047	0.039	0.034	0.078
AR (2) p-value	0.849	0.854	0.767	0.82	0.264	0.125
Nb. of instruments	5	7	8	9	10	11
Countries	49	49	49	49	48	39

Robust standard errors in parentheses. * p <0.10, ** p <0.05, *** p <0.01.

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Minerals for energy transition

Pays	Métaux	Rang 2022	Part de la production monde	Part des réserves monde	Part des exportations monde	Premier partenaire commercial
Afrique du Sud	Chrome	1	43,9%	35,7%	33,3%	Chine
	Manganèse	1	37,6%	37,6%	16,5%	Chine
	Platine	1	73,7%	90%	20,8%	Chine
RDC	Cobalt	1	68,4%	48,2%	47,6%	Chine
	Tantale	1	43%		2,5%	Chine
Gabon	Manganèse	2	23%	3,6%	8%	Chine
Mozambique	Graphite	2	13%	7,6%	12%	Chine
	Titane	2	13,3%		6,9%	Chine
	Titane	3	10,6%		5,8%	USA
	Vanadium	3	9,1%	13,5%		
	Cuivre	3	10%	3,5%	4,5%	Chine
	Graphite	3	8,5%	7,9%	10,8%	Chine
	Platine	3	7,8%	1,7%		
	Terres rares	5	1,5%			
Zimbabwe	Chrome	5	4,4%		2,2%	Chine
	Etain	6	6,5%	2,8%	12,6%	Chine
	Titane	7	3,8%		1%	USA
Zambie	Cuivre	7	3,5%	2,1%	2,2%	Chine
	Lithium	7	0,6%	1,2%		
Madagascar	Cobalt	11	1,6%	1,2%	1%	Japon
Tanzanie	Graphite	14	0,6%	5,4%		

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Figure 5: Minerals critical to energy transition in african countries

Recent developments in mining taxation

Table 2: Latest revision dates for mining codes

Tunisia	2003	Algeria	2014
Liberia	2005	Burkina Faso	2015
Madagascar	2006	Marocco	2015
Niger	2022	Chad	2016
Mauritania	2008	Ghana	2016
Zimbabwe	2010	Sierra Leone	2016
Mozambique	2012	Tanzania	2016
South Africa	2012	Zambia	2016
Burundi	2013	DRC	2018
Guinea	2013	Côted'Ivoire	2019
Senegal	2016	Mali	2020

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Recent developments in mining taxation

Figure 6: Ad valorem mining royalty rates by country and metal type (or category)
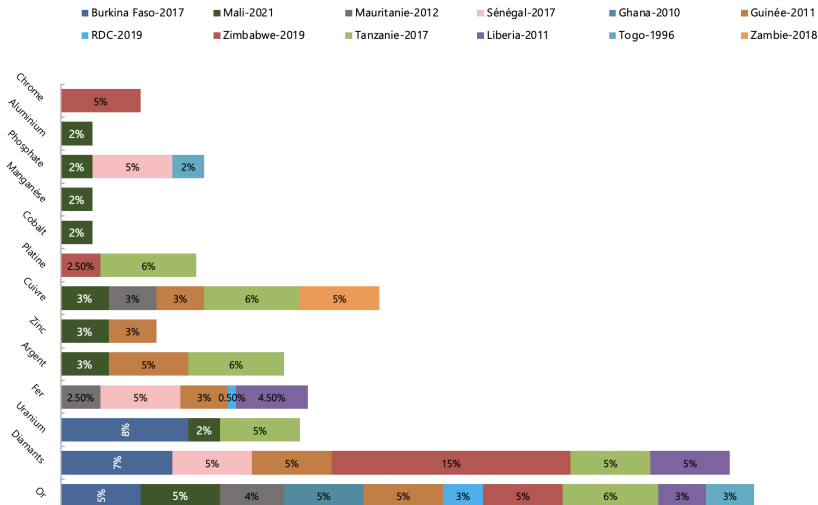
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Challenges of Extractive Governance

- Weak capacity of tax and mining administrations in the countries ;

- Tax competition between countries on the continent ;

- The non-taxation of the artisanal sector, which plays an important role in the mineral transition;

- Stabilization clauses in past agreements, freezing tax provisions for periods of 10 to 30 years and rendering new tax provisions ineffective.

- Aggressive tax optimization: 15 African countries were losing between $450 and $730 million a year in corporate income tax revenues, due to profit shifting by multinational companies.

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The role of governance in environmental protection

"Does transparency matter? Evaluating the Impacts of the Extractive Industries Transparency Initiative (EITI) on Deforestation in Resource-rich Developing Countries." *World Development 173 (2024): 106431.* [Kinda and Thiombiano, 2024]
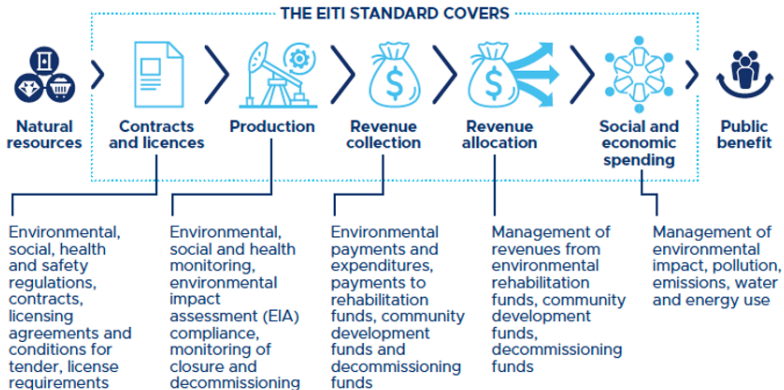

Figure 7: ENVIRONMENTAL REPORTING ACROSS THE VALUE CHAIN

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The role of governance in environmental protection
Data

- Panel of 83 resource-rich countries over the period from 2001-2017.

- Extractive-dependent countries: 25% of minerals in the tangible exports [Haglund, 2011].

- EITI, take **1** in the year that country is a member and **0** otherwise.

- Outcome variable **(Trees cover loss)** is the change forest one year.

- Control variable: Resource rents, GDP growth, Internal Conflict, Av. Precipitation, Population density, Industrial value_added, Rule of law

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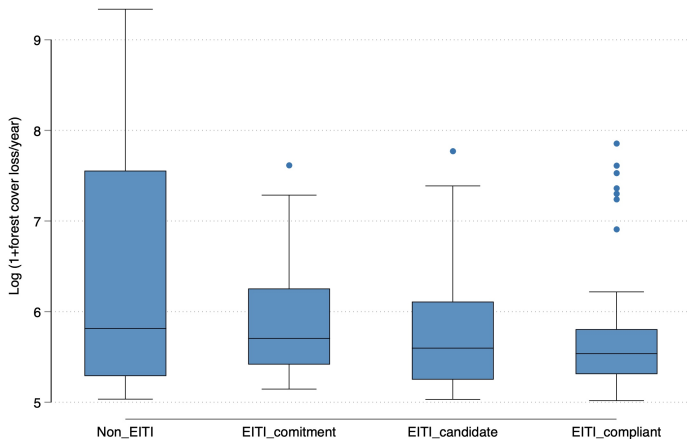# The role of governance in environmental protection
Stylized facts

Figure 8: Distribution of forest cover loss by EITI implementation stage

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The role of governance in environmental protection

Identification strategy: Entropy balancing

$$ATT = E[Y_{it}^1 | EITI_{it} = 1, p(X_{it})] - E[Y_{it}^0 | EITI_{it} = 0, p(X_{it})] \qquad (1)$$

Table 3: Impact of EITI membership on forest cover loss

Dep. Variable: Forest loss year (ha)	EITI_commitment		EITI_candidate				EITI_compliant			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
EITI (Baseline ATT)	-352.7***	-337.1***	-333.8***	-313.7***	-426.9***	-398.9***	-332.3***	-334.3***	-690.2***	-639.5***
	(113.6)	(109.2)	(120.5)	(116.0)	(145.7)	(140.4)	(124.1)	(121.5)	(246.3)	(235.1)
N.Obs.	1,037	1,037	1,037	1,037	972	972	1,037	1,037	817	817
R-squared	0.032	0.073	0.028	0.068	0.038	0.078	0.020	0.063	0.049	0.093
Including Covariates	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Including Commitment period Obs.	Yes	Yes	0*	0*	No*	No*	0*	0*	No	No*
Including Candidate period Obs.	Yes	Yes	Yes	yes	Yes	Yes	0*	0*	No	No*
Including Compliance period Obs.	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	yes	Yes
Country-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; 0* indicates that we keep the observations of the said period (commitment and/or candidate) in the pre-EITI adoption period. No* indicates that we delete the observations of the period prior to the considered EITI implementation stage.

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Concluding remarks

- By improving institutions and increasing citizens' standard of living using revenues, governance can reduce environmental damage

- Through a fair and transparent resource tax regime and environmental payments EITI contribute to reducing deforestation (300–760 ha)

- Polluter pays: apply the ecotax to companies whose activities generate environmental externalities.

- Promoting corporate social responsibility (CSR) in the extractive sector

- Strengthen social and green spending

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THANK YOU!

Comments?
Questions?
Suggestions?

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References I

📄 Bebbington, A. J., Bebbington, D. H., Sauls, L. A., Rogan, J., Agrawal, S., Gamboa, C., Imhof, A., Johnson, K., Rosa, H., Royo, A., et al. (2018).
Resource extraction and infrastructure threaten forest cover and community rights.
Proceedings of the National Academy of Sciences, 115(52):13164–13173.

📄 Dobbs, R., Oppenheim, J., Kendall, A., Thompson, F., Bratt, M., and Van Der Marel, F. (2013).
Reverse the curse: Maximizing the potential of resource-driven economies.
McKinsey Global Institute.

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Haglund, D. (2011).
Blessing or curse?: the rise of mineral dependence among low-and middle-income countries.
Oxford Policy Management.

Kinda, H. and Thiombiano, N. (2021).
The effects of extractive industries rent on deforestation in developing countries.
Resources Policy, 73:102203.

Kinda, H. and Thiombiano, N. (2024).
Does transparency matter? evaluating the impacts of the extractive industries transparency initiative (eiti) on deforestation in resource-rich developing countries.
World Development, 173:106431.

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References III

Seymour, F. and Busch, J. (2016).
Why forests? Why now?: The science, economics, and politics of tropical forests and climate change.
Brookings Institution Press.

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