

Conservation, conflict and semi-industrial mining: the case of eastern DRC



Summary

Semi-industrial mining in and near protected areas in eastern DRC exacerbates violent conflict in three ways: 1) it fosters competition between political-military networks; 2) it creates new, and exacerbates existing, conflicts; and 3) it intensifies popular grievances because of negative social and environmental impacts. In a militarized environment, conflict and competition can spark violence and foster popular support for armed groups. Measures to curb mining in protected areas need to take these different effects on conflict dynamics into consideration. Policymakers and donors need to ensure that such measures do not exacerbate conflict, competition and grievances by 1) fostering broad support for them among different (civilian and military) state agencies and at different administrative levels; 2) anticipating displacement effects; and 3) carefully assessing the impact on local livelihoods.

Introduction

Around the world, many important areas for biodiversity conservation have become sites of industrial, small-scale and artisanal mining (Durán, Rauch & Gaston, 2013). The detrimental effects of mining on biodiversity have been well documented (Villegas et al., 2012; Alvarez-Berríos & Aide, 2015; Sonter, Ali & Watson, 2018). Yet mining in conservation areas also has negative consequences for conflict dynamics, in particular where these areas are mired in armed conflict. This brief outlines these consequences for small-scale or semi-industrial mining. It draws on evidence from two protected areas in eastern Democratic Republic of the Congo (DRC): the Itombwe Nature Reserve (INR) located in South Kivu province, and the Okapi Wildlife Reserve (RFO), located in Ituri and Haut Uélé provinces. We argue that semi-industrial mining aggravates violent conflict in three ways: first, it fosters competition between political-military networks; second, it creates new and exacerbates existing conflicts; and third, it intensifies popular grievances as a result of the negative social and environmental impacts.

Adequately grasping how mining in protected areas fuels armed conflict is crucial for designing effective measures to better regulate mining activity and phase it out: ill-guided efforts to achieve this can exacerbate problems instead of solving them. Carefully assessing how mining in protected areas feeds into armed conflict is therefore a necessary step for tackling this problem.

We do not argue that semi-industrial mining in protected areas is a main cause of armed conflict in eastern DRC: as the debate on so-called “conflict minerals” has shown, this assumption overlooks other drivers of conflict and violence, other sources of financing for armed groups, and the sociopolitical and governance aspects of natural resources exploitation (Nest, 2011; Cuvelier, Vlassenroot, Olin, 2014; Vogel, 2022). Yet we do observe that mining in protected areas transforms and intensifies existing armed conflict in important ways.

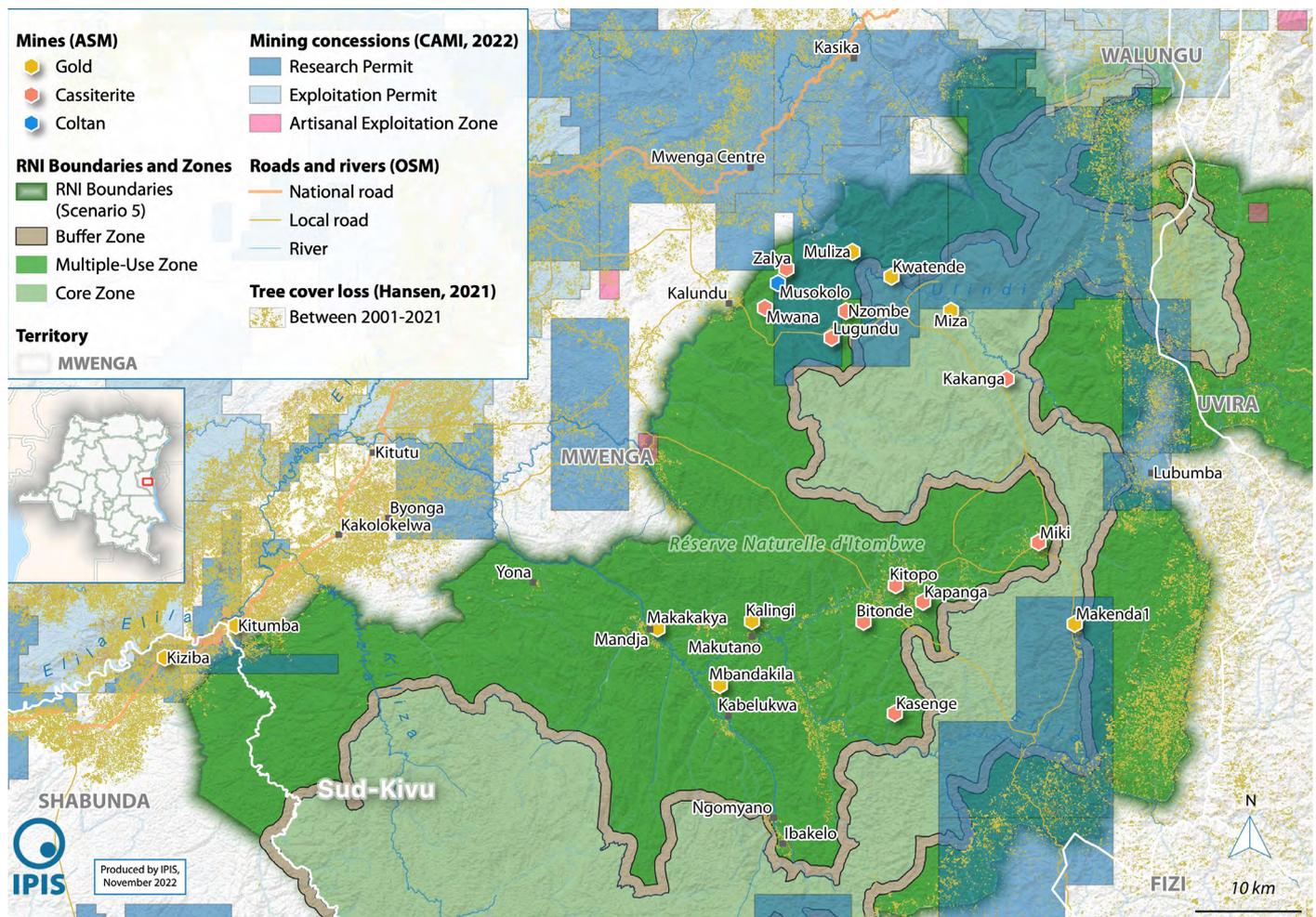
Semi-industrial mining involves intermediate mining technologies such as dredges, mechanical diggers and pumps,

Figure 1. Mining activity in Itombwe Nature Reserve (only a part of active artisanal mining sites is displayed, for a full overview see Annex A).

as opposed to the more basic technologies used in artisanal mining. It is therefore more capital intensive and involves higher yields than artisanal mining. This raises the stakes around access to mineral deposits. In addition, especially where it happens partly or wholly illegally, semi-industrial mining requires backing by powerful figures, such as army officers, who can reassure investors that their perilous projects will be profitable. The use of intermediate technologies also tends to exacerbate the negative environmental impacts of mining. As we show, these different factors cause semi-industrial mining to have a significant impact on dynamics of armed conflict.

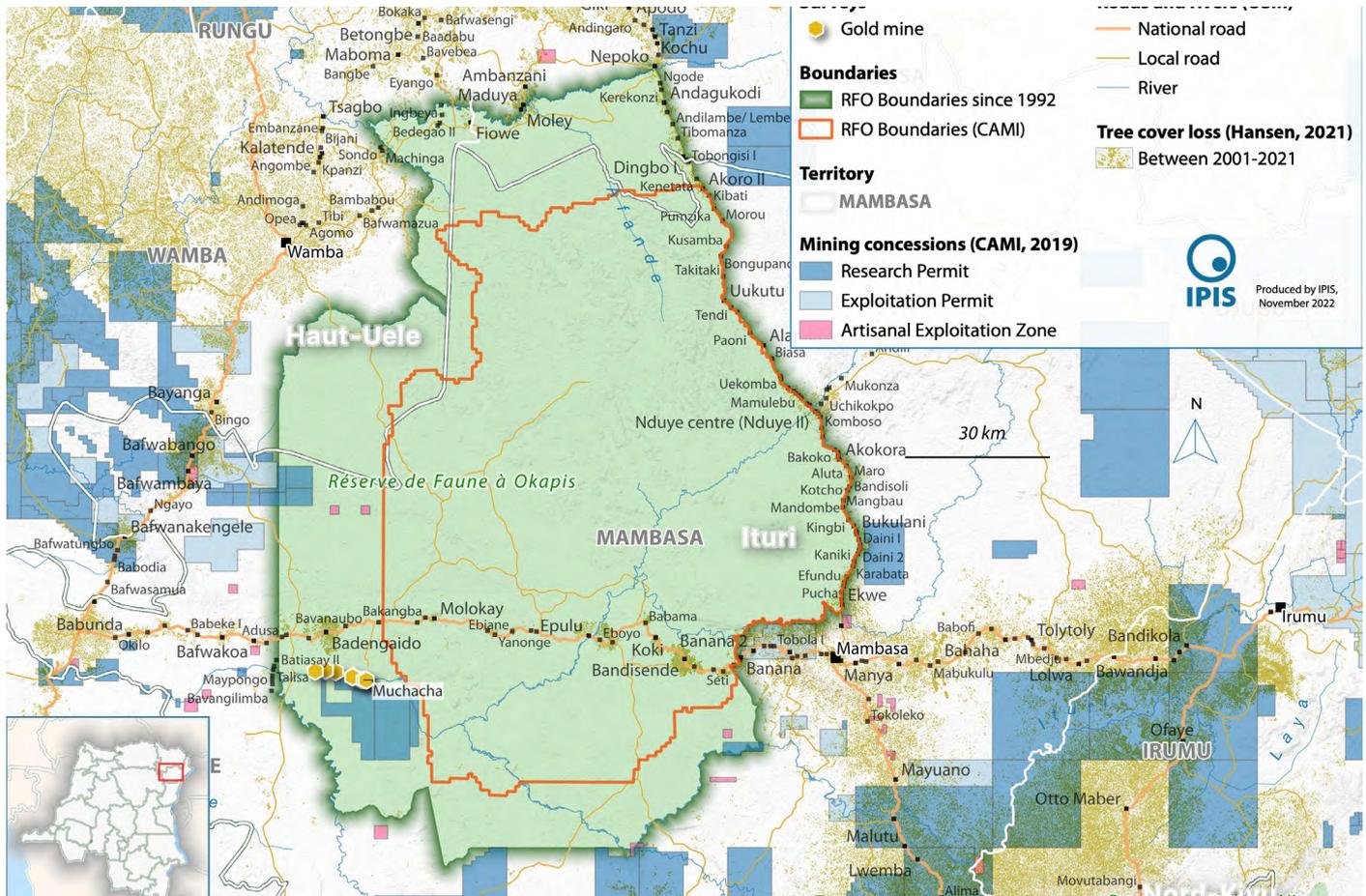
Mining and conservation in eastern DRC

Overlaps between conservation and artisanal, industrial and semi-industrial mining activities are extensive in eastern DRC. For example, Canadian gold mining companies used to hold permits that overlapped with the Itombwe Nature Reserve (INR) and the Okapi Wildlife Reserve (RFO) (Schouten, 2015; Simpson & Zirhumana, 2020).¹ Yet none of these licenses have



1. Banro used to hold three exploration licenses and one exploitation permit – recently sold

Figure 2. Mining activity in Okapi Wildlife Reserve (only a part of active artisanal mining sites is displayed, for a full overview see Annex A).



ever transitioned into active mining, because of structural constraints, including ongoing insecurity, logistical difficulties, and international backlash.

Artisanal mining, by contrast, is rampant within both INR and RFO. Our research identified between 34 and 40 active artisanal gold and cassiterite mines in INR and 18 active gold and diamond mining sites in RFO (see Figures 1 & 2 and Annex 1). Some of these mines can draw in significant numbers of miners at certain times of year. For instance, the large cassiterite mine of Zombe in Basile chiefdom – an administrative territory that overlaps with INR – can host up to a thousand miners during a busy period. Mining areas in RFO are even more crowded, with the interconnected string of riverine mining sites in the southern portion of the reserve drawing between 15,000 and 25,000 artisanal miners.

More recently, semi-industrial mining has been on the rise at the edge of and even inside protected areas. These activities take place in rivers, using dredges, and on land, using excavators. They are initiated by both Congolese and

foreign, most often Chinese, entrepreneurs. In RFO, semi-industrial mining first emerged in the early 2010s when dredging operations that started outside of the reserve gradually moved inwards (Schouten, 2015). Initially, these operations were mostly run by foreign, mostly Chinese, entrepreneurs with connections to army commanders, but Congolese businesspeople soon followed suit. Today, there are well over 40 different dredging operations in RFO that run day and night. In South Kivu province, several Chinese companies have established semi-industrial mining operations since 2019. At least two of these mines are situated close to the edge of INR, in the villages of Kitumba and Kiziba, respectively in Wamuzimu chiefdom and Wakabango 1 sector. The influx of semi-industrial mining in and close to these two nature reserves has aggravated violent conflict in several ways, with negative consequences for local inhabitants' security and for biodiversity.

to a consortium led by the Strategos Group (ACP, 2022) and Loncor used to have exploration permits overlapping with the RFO (Schouten, 2015).

The mining-conflict-conservation nexus

To grasp how industrial mining in protected areas exacerbates violent conflict, it is necessary to understand the drivers of armed conflict in eastern DRC. As previous research has shown (Stearns et al., 2013; Verweijen, 2016; Vlassenroot & Verweijen, 2017), armed conflict is the product of a number of complex, interacting dynamics, including 1) competition between power networks operating at different scales (local, provincial, national, Great Lakes region), which bring together armed and non-armed, state and non-state actors, including politicians, businesspeople, and army and rebel officers; 2) intense conflicts that manifest at the local scale, in particular, conflicts around land, local authority, local governance and identity 3) grievances related to these conflicts and the erratic nature of the Congolese state and economy, which cause multifaceted insecurity and legitimize soliciting protection from armed groups and powerful elites. In this briefing, we show how semi-industrial mining in protected areas feeds into each of these three drivers of armed conflict.

Fostering competition between political-military networks

One reason why semi-industrial mining fuels competition between power networks that link civilian and military actors is that such mining is comparatively capital intensive and therefore requires backing from powerful actors. In addition, it often operates at the edge of legality. Obviously, semi-industrial mining in protected areas is forbidden. But even when not located in these areas, many semi-industrial mining operations violate Congolese laws and regulations, which is key to their profitability. To start with, they often lack an exploitation license. Moreover, rather than being declared, registered and taxed, most gold is sold and exported under the radar. In addition, entrepreneurs commonly fail both to conduct proper environmental impact assessments and to sign mandatory agreements with surrounding communities to make social investments. Finally, many semi-industrial mining operations flout Congolese labour laws, given that their employees work long hours, for low salaries and without adequate protection (Metawina & Vircoulon, 2022).

To circumvent control, companies use different strategies. To start with, they often use artisanal mining cooperatives as shells. It then appears on paper that the mining sites are exploited by groups of artisanal miners, whereas in reality it is foreign or Congolese investors who are organizing production. To prevent interference from the mining administration or other Congolese state agencies, investors also seek backing from influential politicians and army officers, who get a part

of the revenues in return. In addition, investors generally buy off local authorities and low-level administrators to ensure their operations can continue unhindered (Metawina & Vircoulon, 2022; UNSC, 2022). Because semi-industrial gold mining operations can yield at least a kilo of gold a day when in full production (with a street value of 40,000 USD), buying this support is relatively easy (interviews, Niania, June 2021).

Typically, units of the Congolese army (FARDC) connected to the officers that protect the venture seal off the operational area from unwanted visitors, in exchange for protection fees. These army units are sometimes also used to chase away artisanal miners who first occupied a site — indeed, it is often artisanal miners' yield that indicates prospective locations for semi-industrial miners. In the mining site Muchacha in RFO, the Congolese army has violently expelled and harassed thousands of artisanal miners since 2020, in favor of the Chinese mining venture Kimia Mining Investment, which holds a concession to a nearby area (UNSC 2022; Actu7, 2022). But these artisanal miners are there illegally too. Their presence has similarly been facilitated by arrangements with political and military elites, administrators, armed groups and local authorities, who all have a share in the profits through patronage, taxation or payoffs. Obviously, those participating in these arrangements have not been happy with the changing status quo. Moreover, some of the artisanal miners who were forcefully evicted are suspected to have resorted to banditry or joined the armed groups that protect artisanal mining in other parts of the reserve (UNSC, 2022).

Throughout Ituri province, Chinese mining operations are a major vector of competition and conflict among political-military networks straddling different administrative levels, which vie for influence and a cut of the revenues. This competition occasionally turns violent. In 2019, the provincial member of parliament Didier Boyoko was sentenced to 20 years of prison for having organized an ambush by FARDC soldiers on a vehicle of the Chinese mining company Xin Ding Yuan, enabling them to steal 12 bars of gold. The ambush led to the death of one Chinese national and the FARDC soldier in charge of his protection (Radio Okapi, 2019; ACP, 2020). During our fieldwork in RFO in June 2021, a jeep transporting 31 ingots of gold produced by a Chinese mining operation was held up by rangers of the Congolese agency for nature conservation (ICCN) who seized the gold, allegedly after having been tipped off by FARDC soldiers. This led to tensions with other factions in the FARDC, causing a shoot-out between two FARDC commanders in Badengaido a few days later. When the case appeared before a military court, a representative of the provincial ministry of mines—which had issued the Chinese company an exploitation permit—claimed that the mining site where the gold had been extracted was located outside the RFO. This was vehemently denied by the ICCN,

which accused the mining cadaster (CAMI) of circulating a false map of the RFO where the boundaries had been changed (WCS, 2020; FAAPA, 2021; see Figure 2 for the RFO boundaries claimed by CAMI).

Non-state armed actors get involved in these struggles too. For instance, an unknown armed group attacked the Chinese mining operation Congo Blueant Minerals in Kitumba on 21 November 2019, leading three Chinese workers to be kidnapped and taken into the INR. They were later released in Lulimba in Fizi territory after a ransom was paid (Mapenzi & Safari, 2019). The chief of Bingili Bazala groupement (administrative division that overlaps with the INR) and several other men were arrested and imprisoned in Bukavu for four months after having been accused of complicity with this attack (focus group, Kitumba, May 2021). Such attacks demonstrate the violent repercussions of competition between power networks that encompass both armed and non-armed actors and which do not hesitate to deploy force in order to gain control over mining operations or access the revenues.

Given the high stakes, efforts to crack down on semi-industrial mining operations have led to further tensions between different power networks. These tensions, in turn, generate frictions between different levels and divisions of the state. From 2020 onwards, the Governor of South Kivu province initiated a series of measures to reinforce control over Chinese mining operations in Mwenga territory. These included ordering the withdrawal of all FARDC soldiers from the mines and on 20 August 2021, after considerable pressure from Congolese civil society organizations, temporarily suspending all Chinese mining operations. However, on 2 September 2021, the DRC's (national) Minister of Mines objected to the (provincial) Governor's decision, stating that he did not have the authority to suspend mining operations. Earlier, on 15 August 2021, an advisor to the DRC's (national) Minister of Mines had accused the Governor and Minister of Mines for South Kivu province of helping Chinese companies establish mining operations. These quarrels reflect considerable tensions between the national and the provincial level. These tensions also took on a political dimension as the Governor and national Minister of Mines belong to two competing alliances of political parties. In part as a result of these frictions, effective measures to regulate semi-industrial mining have yet to be implemented (Metawinwa & Vircoulon, 2022).

Generating and exacerbating conflicts

Competition between political-military networks feeds into and is aggravated by the intense conflicts that mark eastern Congolese society, and that are in part a result of a broader crisis of authority (Vlassenroot, 2004). Customary chiefs

have steadily lost in legitimacy, but remain overall powerful, including in regulating access to land. Civilian authority has eroded after decades of violent conflict, causing both the army and armed groups to play an important role in local governance, but not without contestations. The overall weakening of authority and lack of robust conflict regulation mechanisms has in turn legitimized resorting to violence as a means of settling disputes (Eriksson Baaz & Verweijen, 2014; Verweijen, 2019; Vlassenroot & Verweijen, 2017). These dynamics are also at play in relation to semi-industrial mining operations, which generate and exacerbate conflicts that are difficult to resolve.

Importantly, semi-industrial mining has aggravated conflicts between the military and civilians, including in relation to local governance. As mentioned, the arrival of semi-industrial mining operations has been accompanied by an influx of government soldiers into remote areas who protect the mining operation and foreign workers. Yet these soldiers frequently engage in abuses. To start with, they construct roadblocks from where they impose illegal taxes on the population. For example, in RFO, the FARDC has established a barrier at Penge, on the road to the Muchacha gold mine, which is estimated to generate more than 1,000 USD a day (UNSC, 2022). Furthermore, in INR, FARDC soldiers stationed in the villages of Kitumba and Kiziba, where Congo Blueant is mining, impose forced labour on the population. Inhabitants who refuse to participate are fined between 50,000-150,000 Congolese Francs (25-75 USD) (focus group, Kitumba, May 2021).

Government soldiers deployed to protect semi-industrial mining operations are also accused of arbitrary arrests, harassment, beatings and stealing the possessions and land of local people: 'here we live in a form of military occupation, the military behave more as warlords than defenders of the people!', said an interviewee in Kitumba (focus group, Kitumba, May 2021). In addition, local leaders feel that their authority is undermined by the presence of the army. A resident of Kitumba exclaimed: 'the military have no respect for the local authorities, and they completely disregard customary power.' (interview, Kitumba, May 2021). In August 2021, FARDC soldiers deployed to Wamuzimu chiefdom arrested the chief of Mpute groupement (a local administrative division) and chased away and replaced the chief of Kamwanga groupement and village chiefs in Lugushwa after they opposed the Chinese mining operations (Mapenzi, 2019). These conflicts have further intensified distrust of the military, which in turn can reinforce sympathies for armed groups. The situation in RFO, where the Congolese army reportedly has engaged in physical abuse against artisanal miners is similar (UNSC, 2022). As civil society representatives in Badengaido (inside RFO) told us, "If an armed group comes and attacks Badengaido and manages to repel the army, the population will applaud

because our army no longer knows its role, it has entered the mining business” (interview, June 2021).

Semi-industrial mining operations have also exacerbated conflicts between people and local authorities. These operations are often unpopular as they bring limited benefits to the population, while the disadvantages are profound. The

Figure 3. Forest cover loss around the Kitumba mining operation bordering INR (cloud-free composite images using Sentinel-2 data)

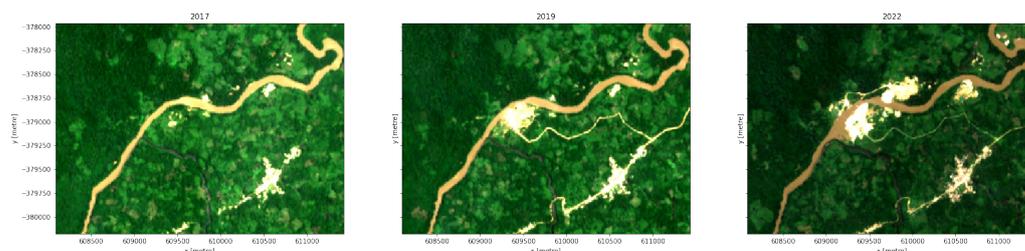
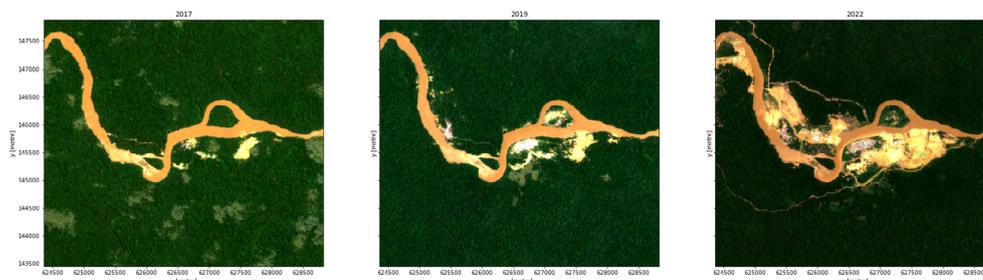


Figure 4 Forest cover loss around the Muchacha mining operation bordering RFO (cloud-free composite images using Sentinel-2 data)



latter include: curtailing artisanal mining, which is often a key source of revenue in the area; growing insecurity as a result of increased army presence and armed group attacks; and negative environmental impacts, as further outlined below. Yet local authorities, in particular customary chiefs who are considered to be de facto owners of the land belonging to their communities, often do benefit from these operations. For instance, the customary chief (or ‘Mwami’) of Wamuzimu chieftom signed a protocol agreement with several Chinese companies (Metawinwa & Vircoulon, 2022). The fact that some chiefs are seen to act against the interests of the populations they represent feeds into discontent towards them and erodes their legitimacy. This hampers their ability to resolve conflicts between semi-industrial mining companies and local inhabitants.

Indeed, the arrival of semi-industrial mining operations has sparked a host of conflicts with the surrounding population. These conflicts generally center on compensation for destroyed agricultural fields, the realization of social investments and disagreement over employment, such as unjustified dismissals. The failure of the state and local leaders to regulate these conflicts appears to have fostered the idea among some that violent ways of settling these disputes are justified. In recent years, there has been a spate of attacks on Chinese nationals in eastern DRC. These attacks

are not only the result of struggles for power and revenue, as outlined above, but are also informed by the broader conflicts pitting mining companies against the population. They are further facilitated by anti-foreigner sentiments that appear to lower the threshold for the use of violence, as evidenced by regular attacks against Chinese nationals that also occur

in other mining provinces in the DRC (Olander, 2022).

On 21 November 2021, a policeman was killed and five Chinese miners were kidnapped when an armed group attacked a mining site near the village of Mukera in Fizi territory, South Kivu (Lavoix, 2021a). The Chinese miners, who were working for Beyond Mining company in collaboration with the COMIDI cooperative, were held hostage for six months. The attack came at a time when the population was protesting the cooperative’s and company’s failure to respect their promises to provide compensation to farmers who had been dispossessed of their fields and to improve the road in this isolated area (Lavoix, 2021b; AFP, 2022). In August 2022, an attack took place on the Chinese company Oriental Resources Congo near Kaboge in Mwenga, leading to the death of a Congolese employee. The attack, which was described as an act of “sabotage”, came shortly after the authorities had lifted the temporary suspension of Chinese mining operations in Mwenga, despite strong protest of civil society organizations which maintained that it was too early to lift the ban (Lufiauluisu, 2022).

Intensifying popular grievances

In the previous sections, we have outlined how the arrival of semi-industrial mining companies has intensified conflicts and insecurity, and how this has fed into wider grievances

against the state, including the military. These grievances are further fueled by the negative effects of semi-industrial mining on local inhabitants' livelihoods options. Aside from the curtailment of artisanal mining, deteriorating livelihoods result from the detrimental effects of semi-industrial mining on ecosystems. These effects are felt even more acutely in or near protected areas, where people face restrictions on resource use related to biodiversity protection (Vuola & Simpson, 2021).

Among the key environmental impacts of semi-industrial mining are deforestation, and forest and land degradation, leading to habitat fragmentation for wildlife. Since 2019, the Kitumba mining operation near INR has led to approximately 82 hectares of tree cover loss, as shown in Figure 3. In RFO, the Congolese Environmental Ministry estimates that semi-industrial mining has entailed deforestation of 249,083 hectares of land.² Near the Muchacha mine, forest cover loss amounts to approximately 178 hectares (see Figure 4). This is only a fragment of total deforestation due to mining operations just outside the perimeter of the reserve, which affect a total of 1,260,304 hectares of primary forest (see Table 1, mid-2021 figures).

Table 1: Deforestation rates as calculated by Congolese Environmental Ministry, based on the analysis of satellite data

Name of mining operation/ allied cooperative	Location	Estimated deforestation (ha)
Dragon	PK 18	208.708
COOMEA	Balili-Tindika	24.147
Kimia Mining	Muchacha/Balenga/Talisa	249.083
Dragon-Coomoi/Coomituri	PK21	51.109
SOCOOMIK	PK 20	65.599
Dragon mining & COOMOI	Vatican/Bisisa/Jerusalem	559.786
SOCOOMINDOK-COOMIDI	PK7 Tindika	101.872
Total		1.260.304

Mining causes deforestation and forest and land degradation as a result of the removal of topsoil and flora to access the soil to be processed. The same problems are caused by the construction of roads leading up to mining sites, which clears yet more land, but also improves access to previously remote areas. Enhanced access creates links to wider markets and stimulates the extraction of a wider range of resources aside from minerals, such as bushmeat, timber and charcoal, while

also facilitating human habitation and shifting cultivation (cf. Kleinschroth et al., 2019; ICCN, 2021). For example, in INR, government soldiers posted to protect semi-industrial mining operations started organizing the production and trade of charcoal and timber between the villages of Kitumba and Kiziba. The charcoal is mainly sold in the regional center of Kitutu and the wood is taken onto to South Kivu's capital Bukavu (interviews, Kitumba, May 2021).

Mining also interferes with river ecosystems. River dredging, the prevailing form of semi-industrial gold mining, involves clearing flora from the riverside and vacuuming up the river bottom to extract gold. Scientific research into the environmental impacts of river dredging in eastern DRC has so far been limited, but rivers are visibly discoloured and downstream populations in both study sites complain of declining fish stocks and degraded water quality (cf. Inamuco, 2022). A resident of Kitumba village described how, 'Where the Chinese work there are no fish because they are digging the bottom of the river to take sand which contains gold.' (interview, Kitumba, November 2019). Furthermore, just like artisanal mining, semi-industrial mining relies on the local application of chemicals to purify gold, typically mercury or cyanide, which are toxic to human health. These chemicals enter local ecosystems, leading to soil pollution and the transfer of toxins to downstream populations, including via the consumption of contaminated fish (UNEP, 2016).

The damage to rivers and terrestrial ecosystems caused by semi-industrialized extraction can negatively affect people's livelihoods, undermining their access to fuel wood, clean drinking water, fish, and land to cultivate. Around the two protected areas we have studied, livelihoods losses caused by mining interlock with the restrictions imposed by conservation to generate double grievances (Vuola & Simpson, 2021). One farmer expressed the feeling of being 'trapped' between the reserve and the Kitumba mining site: 'we are being held hostage because of our wealth!' (interview, Kitumba, November 2019). While the links between grievances and armed conflict are complex, research on other protected areas in eastern DRC has shown that where people experience hardships and are discontented with conservation regulations, they sometimes step up their support for armed groups defying these regulations (Verweijen & Marijnen, 2018). Indeed, some armed groups, including in RFO, actively use anti-conservation discourses in order to draw recruits and attract political and popular support (Verweijen et al., 2022). Sympathy for armed groups sabotaging conservation regulations may be reinforced where semi-industrial mining operations appear that devastate ecosystems in protected areas with seeming impunity, while implicating state services.

These observations show that there are complex feedback

2. However, these figures do not appear to disaggregate forest cover change due to earlier artisanal mining from that induced by semi-industrial mining.

loops between conservation, armed conflict and semi-industrial mining. The arrival of mining operations tends to ramp up violence, including by eliciting armed group attacks. These attacks, in turn, hamper the work of conservation agencies. For example, a violent attack on a Chinese mining operation near INR led ICCN rangers to abandon their patrol post in Kitumba and relocate to another village (personal communication with INGO representative, August, 2021). Members of the Congolese army have since taken up residence in the patrol post, but have started to engage in destructive resource use. Because of their engagement in harassment and extortion, their presence has also led to growing insecurity for local populations. The resulting discontent with the Congolese army, in turn, may lead to growing support for armed groups in the area, which can spark further violence.

Concluding thoughts

Researchers and policymakers are increasingly turning their gaze towards mining in protected areas with an eye to documenting and mitigating the detrimental effects on biodiversity. Aside from these ecological impacts, as this brief has shown, mining in protected areas also merits attention because of its knock-on effects on armed conflict. Grasping these effects is important for developing interventions that can help mitigate this destructive activity.

To start with, given how semi-industrial mining fuels competition between political-military networks, any

measures to curb or regulate mining should be designed in a way that they do not easily become an instrument of such competition. This requires broad support for interventions among different (civilian and military) state agencies and at different administrative levels—from the local to the national. Second, it is crucial to carefully consider the impact of efforts to curb mining on the multiple ongoing conflicts that feed into armed violence. For instance, where enforcement measures require increased deployment of government soldiers in the face of ongoing civil-military tensions, they may end up being counterproductive. In addition, where efforts to curb mining undermine the revenues of military elites and armed groups, displacement effects should be anticipated and factored into decision-making. Third, it is important to take existing grievances into account, in particular, in relation to the population's ongoing livelihoods struggles. Ultimately, phasing out semi-industrial mining and safeguarding biodiversity in protected areas require support for these initiatives from the people living in the affected areas. However, such support is unlikely to materialize where people feel that their needs and wants are systematically disregarded. Finally, owing to the complex feedback loops between armed conflict, conservation and mining, a holistic approach that considers their multiple direct and indirect inter-linkages is warranted.

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Annex: Artisanal mines inside INR and RFO

Table 2. Artisanal mines inside Itombwe Nature Reserve

Number	Mining site	Mineral(s)
1	Nzombe	cassiterite
2	Musokolo	cassiterite
3	Lugundu	cassiterite
4	Nakamonano	cassiterite
5	Zalya	cassiterite
6	Kakanga	cassiterite, gold
7	Wimbi	coltan
8	Muliza	cassiterite, gold
9	Miza	gold
10	Isumbu	cassiterite
11	Mwana	cassiterite
12	Kemya	cassiterite
13	Mukunguzi	cassiterite
14	Mukyekukye	gold
15	Mwembeje	cassiterite, gold
16	Kabilombo	cassiterite, gold
17	Alema	gold
18	Makenda	gold, cassiterite, coltan
19	Chichima	gold
20	Kipombo	gold
21	Miki	cassiterite, gold
22	Bitchaka	cassiterite
23	Bitonde	cassiterite
24	Kitopo	cassiterite
25	Asebu	cassiterite
26	Asenge	gold
27	Yambembi	gold
28	Makakakya	gold
29	Kalingi	gold
30	Mbandakila	gold
31	Kapanga /Apanga	cassiterite
32	Cigubi	cassiterite
33	Cigobe	gold
34	Miribu	gold
35	Kwawenga*	gold
36	Kwatende*	gold
37	Nabende*	gold
38	Mbembe*	gold
39	Lwemba*	gold
40	Kalolole*	Gold

Table 3. Artisanal mines inside the Okapi Wildlife Reserve

Site Number	Site name	Mineral(s)
1	Talisa	gold
2	Muchacha	gold
3	L'île Patmose	gold, diamond
4	Lulungu/Kulungu	gold
5	Paradiso	gold
6	Esui yo Wapi	gold
7	Penge	gold
8	Mapendo	gold, diamond
9	Bawela	gold
10	Salate	diamond
11	Tokobika	gold, diamond
12	Molende	gold
13	Zwa Idee	gold, diamond
14	Kotakoli	gold
15	Mungu iko	gold
16	Tindika	gold
17	Tika Mwana	gold
18	Pkutuka	gold

*Unclear whether inside INR