



*Citation for published version:*

Conteh, FM & Maconachie, R 2021, 'Artisanal mining, mechanization and human (in) security in Sierra Leone', *Extractive Industries and Society*, vol. 8, no. 4, 100983. <https://doi.org/10.1016/j.exis.2021.100983>

*DOI:*

[10.1016/j.exis.2021.100983](https://doi.org/10.1016/j.exis.2021.100983)

*Publication date:*

2021

*Document Version*

Peer reviewed version

[Link to publication](#)

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# Artisanal diamond mining, mechanization~~changing modes of production~~ and elite control in Sierra Leone: Implications for human security?

Felix Marco Conteh<sup>i</sup> and Roy Maconachie<sup>ii</sup>

## Abstract

In recent years, as alluvial mineral deposits in many regions of West Africa have become ‘worked out’, new methods of extraction are becoming increasingly prevalent. In the case of Sierra Leone, traditional artisanal and small-scale mining (ASM) employing rudimentary hand tools has gradually become more mechanized, with the illicit use of heavy machines outpacing the development of laws and policies aimed at regulating them. Drawing on field-based research undertaken in Kono District, in Sierra Leone’s Eastern Province, this paper explores the political economy underpinning the mechanization of ASM, as well as its implications for human security. Popular discourse has frequently employed technical narratives to explain the drivers of mechanization, including dwindling alluvial diamond deposits, unreliable geological data and the weak law enforcement capacity of regulatory agencies. This paper, however, contends that the mechanization of ASM is an elite adaptation strategy through which modes of production are effectively controlled. This process is deeply political and divisive, resulting in the (re)production of winners and losers. But at the same time, the resulting human security challenges of mechanization are immense—including undervalued and dislocated labour, rapid environmental degradation, and the widespread destruction of livelihoods. Although mechanization can increase the speed and efficiency of alluvial diamond extraction, while at the same time enhancing revenue for miners and the government, this paper argues for a gradual, step-wise implementation of “legalized mechanization” in order to carefully weigh up the costs and benefits for communities whose existence depends on mining.

**Key words:** Artisanal mining; alluvial diamonds; modes of production; mechanization, human security; Sierra Leone

## Introduction

In Sierra Leone, artisanal and small-scale mining (ASM) – low tech, labour intensive mineral extraction and processing – provides a livelihood for at least 300,000 individuals (Government of Sierra Leone 2018:11). However, until recently, the ASM sector has remained largely neglected, failing to attract much needed support from the government and donors. Government statistics suggest that in 2014, commodities accounted for 97 per cent of Sierra Leone’s total merchandise exports, of which 12 per cent were from diamonds. In 2015, the country’s total export value of alluvial diamonds was USD 80 million, or 48 per cent of all diamonds exported through official channels.<sup>1</sup> As is the case in many resource-rich African countries, the neglect of the ASM sector has partly been the result of successive governments’ bias towards, and dependence upon, large-scale mining for revenues (Hilson, 2019).

Since the collapse of two of the country’s large-scale iron ore mines in 2014, caused in part by the slump in commodity prices and “economic slow-down in China”, there have been signs of renewed interest in ASM from the Government as well as donors. For example, in 2018 the Cabinet approved the “Artisanal Mining Policy for Sierra Leone”, ending decades of subsuming ASM issues in policies that mostly address large-scale mining; and the World Bank is supporting the implementation of the new policy through the Extractive Industries Technical Assistance Project Phase 2 (World Bank 2017). However, government and donors’ interests in ASM have been accompanied by rapid and substantial changes in the sector, many of which pose significant challenges for policy makers. Most notably, as alluvial mineral deposits in many regions have become ‘worked out’ in recent years, new methods of extraction are commonly being employed. Artisanal and small-scale mining has become increasingly mechanized, with the illicit use of heavy machines in the sector outpacing the development of laws and policies aimed at regulating them. There is also growing involvement of foreign nationals, especially Chinese, in a sector which has historically been exclusively reserved for Sierra Leonean nationals (Government of Sierra Leone, 2009).

This paper contributes to a small, but emerging literature on ASM, mechanization and human security. Drawing on field-based research undertaken in Kono District and Freetown between 2017 and 2019, the paper explores the political economy underpinning the mechanization of the ASM sector, considering the implications this has for human security. Popular discourse has frequently employed technical narratives to explain the drivers of mechanization, including dwindling alluvial diamond deposits, unreliable geological data and weak law enforcement capacity of regulatory agencies. This paper, however, contends that the mechanization of ASM is an elite adaptation strategy through which modes of production are effectively controlled. This process is deeply political and divisive, resulting in the (re)production of winners and losers. As a consequence, the ensuing human security challenges associated with mechanization are significant – including undervalued and dislocated labour, rapid environmental degradation, and the destruction of livelihoods. While mechanization can increase the speed and efficiency of alluvial diamond extraction, in the process increasing revenues for miners and government, this paper advocates for a gradual and step-wise legalization of mechanization, in order to weigh up the costs and benefits for communities whose existence depends on ASM. The main questions which the paper seeks to answer are: what is driving mechanization and its legalization in ASM? And, who benefits and loses from processes of mechanization? Such an enquiry has implications for addressing power imbalances in the ASM sector, as well as the human security of mining communities more broadly.

The paper is divided into six sections. Following this introduction, we review the literature by examining the ASM, mechanization and human security debate. This is then followed by an analysis

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<sup>1</sup> Interview, Director of Mines, National Minerals Agency, Freetown, 6 February 2017.

of the evolving modes of production in ASM, tracing labour relations from the colonial period to the contemporary era. Section three investigates the contested narratives of the drivers of mechanization, teasing out the different and sometimes less obvious, drivers – including the undervaluation and impersonalization of labour. The fourth section of the paper then analyses the government’s reaction to mechanization, while the fifth section broadens the analyses of the impact of ASM and mechanization, highlighting the implications this has for the human security of mining communities. The sixth section concludes the paper.

### **Contextualising ASM, mechanization and human security**

In discussing the adaptability and the appeal of ASM in technologically challenged countries, Hilson suggested many years ago that “small-scale mining plays a pivotal role in alleviating poverty in many rural regions...primarily because it is viable in remote areas with minimal infrastructure where other industries could not function” (Hilson 2002:6). Building on this sentiment, other studies have provided some of the clearest examples of how ASM activities dovetail with those in agriculture, in what is a very organized pattern of livelihood diversification and substitution shaped by a range of factors, including seasonality and the fluctuation in commodity prices (Maconachie 2011; Cartier and Burge 2011; Hilson 2010; Maconachie and Binns 2007; Hirons, 2011; Pijpers 2011). Still other studies carried out in Brazil have demonstrated the importance of ASM in alleviating poverty, not only because of its ability to strengthen resilience in communities badly hit by natural disasters such as drought, but also by the protection of artisanal miners’ rights enshrined in the Brazilian constitution (Peiter et al 2000). Thus, the growth in the importance of ASM is not only driven by poverty; in many instances, it is a lifeline (Peiter et al. 2000).

Although the socio-economic importance of ASM is well established in the literature, the sub-sector has often been viewed differently by stakeholders, and by extension, different institutions (International Labour Organization, 1999: 3). Given the tendency for different stakeholders to have varying perspectives, it is thus difficult for a universally acceptable characterization to emerge; experts seldom agree on a universal typology, and in many cases, countries have developed their own definitions of the sector using different criteria (Hilson 2002). Variations in the scale and scope of ASM operations, and the range of the minerals involved, have led to a picture that is generally mixed – one of bad and good; of environmental degradation and poverty alleviation (Bush 2009). For some, the sector has been defined from the perspectives of its illegality and informality, thriving principally outside the formal regulation of the state, with most ASM operations unlicensed, and with little or no formal support from regulators (Okoh and Hilson 2011, Hilson 2009; Siegal and Veiga 2009).

It is also worth noting that the narratives underpinning ASM are reinforced by discursive power, whereby powerful actors including governments, businesses and NGOs have succeeded in producing and reproducing particular types of discourses related to the sub-sector (Svarstad et al. 2018). To provide one example, the research of Tschakert and Singha into the use of mercury and the marginalization of illicit miners in Ghana offers a clear illustration of how powerful actors, including the state and media, can produce a discourse that criminalises artisanal miners. They note that in “...governmental discourse and the Ghanaian media, galamsey miners have been portrayed as a ‘headache’, ‘challenge’, ‘problem’, ‘menace’, and ‘threat’, whose presence necessitates the implementation of a ‘lasting solution’” (Tschakert and Singha, 2007: 1305). In a sector which is defined by multiple players with diverse interests and impacts on the environment, artisanal miners are however singled out as “villains”, large-scale operators and farmers whose lands are often appropriated for mining are considered “victims”, while state agencies, including regulators and

security forces enforcing laws – sometimes violently - are seen as “heroes” (Tschakert and Singha, 2007:1305).

In the case of Sierra Leone, there is a long history of concerns for human security in volatile diamond producing regions of the country. During the colonial era, security concerns centred on the fear that a flood of migrant youth seeking to make their fortunes would serve to break the bonds of traditional communities, thereby undermining the system of “indirect rule”. In more recent times, attention has turned to the role that diamond-fuelled patrimonial networks assumed in the creation of a socially-excluded rural underclass during the pre-war years, and how they fomented the preconditions for the country’s protracted civil war during the 1990s. In the post-war years, concerns have tended to focus on the risk of a return to violence if the economic and political exclusion of mining youth in diamondiferous regions does not cease. Present-day conditions in diamond mining communities continue to provide ample grounds for grievance amongst miners and communities and have fuelled tension between various actors. Indeed, 15 to 30 year-old males are the very demographic group that is most likely to resume warfare if left frustrated and excluded (MSI 2004).

Despite the vast and growing literature on security issues associated with ASM, a key aspect that has largely remained unexplored is the sub-sectors’ connection with mechanization and its attendant human security implications. It has been suggested that a mechanized ASM sector can improve working conditions, increase technical capabilities among miners, improve health and safety, and increase the income generated by mining communities (Priester et al, 2010: 12; Rupprecht, 2017). However, mechanization is also associated with human security challenges including a “loss of jobs due to the replacement of muscular with mechanical power” and “increased conflict with local communities and authorities i.e. over the environmental impacts of mechanised mining” (Priester *et al*, 2010: 12). In this light, further research is needed to examine the impacts of ASM mechanization through a human security lens, situating the wellbeing of extractive-based communities at the centre of governance and development policy, rather than merely assuming that national and global governance initiatives will have trickle-down effects (Engwicht and Grabek, 2019).

Such an approach resonates clearly with the United Nations’ Human Development Report of 1993, which called for a major shift in the conceptualization of human security, from a focus on national security to “a much greater stress on people’s security...from territorial security to food, employment and environmental security” (UNDP 1993:2). This idea of human security espoused in 1993, was further expanded upon in the 1994 UNDP report to embrace seven interdependent components: economic, food, health, environmental, personal, community and political security (UNDP 1994: 24-25). This more holistic approach to human security meant that individual states were not only responsible for the security of their borders, but all those within them, in the process catering to a wide range of human security needs. Despite this, some critics remained committed to the idea of the state being the primary focus of analysis of human security, arguing that a crisis is only of human security significance when the implications of not addressing it “...cross a state’s borders and assume a truly international significance, affecting other societies and individuals” (Thomas and Tow, 2003:179). This is not only a minimalist conception of human security, it also fails to acknowledge that states are themselves active contributors to individual insecurity (Bellamy and McDonald 2002). This paper shares, and builds upon the view that state-centric approaches to analysing human security are limited (Bellamy and McDonald 2002), given that security should not only be seen as encapsulating “...the absence of violent conflict or other threats to state authority”, but incorporating the security of the individual, which the state has a primary responsibility to protect (Engwicht and Grabek, 2019: 189). It is within this context that this paper explores ASM, mechanization and the implication for human security in Sierra Leone.

### **Evolving modes of production in artisanal mining**

The mode of production in ASM in Sierra Leone has evolved considerably since artisanal extraction was first allowed by the colonial government in 1956 (Van der Laan, 1965; Zack-Williams 1990; 1982; Maconachie 2009; Kamara 2008). Early work by Zack-Williams represents some of the most detailed scholarship focusing on modes of production in ASM, whereby he argued that diamond mining led to underdevelopment in the country, with the metropolitan power, Britain, and its private mining firms which were granted the rights to exploit diamond deposits, becoming the prime beneficiaries (Zack-Williams 1995; 1990; 1982). Adopting a sociological perspective, he distinguished two modes of production within the country's diamond industry – “capitalist and non-capitalist.” The capitalist mode constituted the operations of the Sierra Leone Selection Trust (SLST), a subsidiary of the Consolidated African Selection Trust (CAST), which was granted exclusive rights over diamonds in the country for 99 years. The company had a monopoly in diamond mining and exploration until 1956, when the Alluvial Diamond Mining Scheme (ADMS) was established (Van der Laan, 1965; Zack-Williams, 1990: 96; Reno, 1995; Forde 2011). The ADMS was the result of an agreement between the colonial government and SLST to relinquish mined out and often unproductive lands. This allowed the company to reduce its production costs on the one hand, while at the same time indirectly maintaining its production capacity and control over the diamond market, given that alluvial miners were obliged to sell their proceeds to it.

The employment relations under the SLST were characterised by the “free” sale of labour in exchange for wages, which meant that the worker had “no claim to the final product of his labour, since this was the property of the shareholders of SLST” (Zack-williams1990: 97). On the other hand, under the ADMS, payment to mining tributors was not based on wages, but rather on “percentage sharing”, with the worker having a lawful entitlement to the diamonds recovered. Over time, this non-wage employment relationship evolved into what became known as the “tributor-supporter system” (Zack-williams1990; 1995; Reno 1995). This sharing arrangement largely depended on the parties involved, and in tripartite agreements, the most common division was: Supporter 50 per cent, Tributor 25 per cent and Licence Holder 25 per cent (Zack-Williams, 1990). However, what Zack-Williams referred to as non-capitalist mining was not monolithic, as there were variants including “individual” and “native firm” mining operations, with the most significant differences being that firms were allowed to use mechanical implements such as caterpillars and draglines. This was the first time the use of machines was formally permitted in ASM, and the government not only authorised their use, but it actively participated through the Ministry of Works, which is reported to have rented a dragline excavator to a local miner in Kono (Zack-Williams 1990).

With a massive influx of foreign nationals and their accompanying capital into the mining areas following the establishment of the ADMS (Reno, 1995; Zack-Williams), the use of heavy machines in the sector gradually increased, with well-known Lebanese diamond dealers such as Jamil Sahid, Kassim Basma and Sullay Hijazi exclusively mechanizing their mining operations.<sup>2</sup> This meant that they were able to limit human participation, reduce pilfering and enhance efficiency in their operations.<sup>3</sup> Nevertheless, the generality of mining was done manually, with the tributor-supporter relations remaining the dominant mode of production until after the civil war during the 1990s, when the use of machines accelerated towards its current pace. After the war, machine rental businesses quickly sprang up in the Kono diamond mining town of Koidu, providing increased opportunities for miners, including Sierra Leoneans, to access them. One such business was owned by Sam Sumana, who later

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<sup>2</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2017; interview with CSO Activist, Koidu, 1 February 2017.

<sup>3</sup> Interview with CSO Activist, Koidu, 1 February 2017.

became the country's Vice President.<sup>4</sup> The increased use of machines in the ASM sector is a subject to which the discussion will return to later, but it should be noted that it is not just the extent of their usage that has changed. Our fieldwork revealed that while the tributor–supporter mode of production in ASM described above has persisted with slight changes to sharing arrangements, other forms of production have emerged which have led to a reconfiguration or shift in production patterns. In particular, three modes of production can now be identified: 1) crowd funding mode; 2) wage labour mode; and 3) hybrid mode. Because of the large volume of the literature on the tributor-supporter mode of production, the discussion to follow relates only to the three modes identified above.

The crowd funding mode of production involves a group of miners – usually three to five individuals – who are brought together either by family ties or friendship, who have land ownership, but do not possess the required capital to mine. Rather than go in search of supporters, which considerably limits their legitimate claim to diamonds, they will pool their resources together no matter how meagre, to support their operations. Resources can be contributed in the form of crude mining implements such as shovels and pickaxes, or “food for work” from their individual or collective farms.<sup>5</sup> The practice of miners supplementing mining with agriculture in Africa has been well-researched and documented (Maconachie, 2011; Maconachie and Binns, 2007; Cartier and Burge, 2011; Mkodzongia and Spiegel, 2019), and the seasonal dynamics of the two sectors allow them to switch from one activity to the other, depending on the season. On the one hand, the growth of crowd funding mining is driven by profit maximization. But on the other hand, it has flourished because of the fear of unequal power relations embedded in the tributor-supporter arrangement. As one miner noted during a focus group discussion in Kono District:

We prefer working for ourselves because we have control over the diamonds. Supporters are hard to deal with and some of them are wicked. Sometimes they will agree to support you, but will do so infrequently. Nevertheless, when they hear that you have discovered a diamond, they will take 70 per cent of the proceeds. With this organization, we work when and how we want to, and when we find diamonds, we retain 100 per cent of the proceeds.<sup>6</sup>

Indeed, the structure of the ASM sector lends credence to the fears of the miner, as the imbalance in power runs across many aspects of the relationship between them and supporters who are often well-networked diamond dealers. A typical example here is the asymmetry in information regarding the value and price of diamonds. Our interviews revealed that miners repeatedly portrayed supporters and dealers as belonging to a “cartel” with a high sense of group solidarity.<sup>7</sup> As one miner noted: “once a supporter or dealer knows of your diamond, and offers a price, no matter where you take it, you will not receive more than what you have been originally offered.”<sup>8</sup> In the view of the miner, supporters and dealers constantly fix prices, and attempts by dealers to explain factors that determine the prices of diamonds, such as the cut, clarity, carat and colour, are often discarded as subterfuge. Despite the choice which crowd funding miners have in deciding when and how to work, as well as having 100 per cent legitimate claim to the proceeds, they are still faced with the risk of investing their meagre resources, and not finding any diamonds. As one miner noted, “diamond mining is like finding something where you have not kept it”.<sup>9</sup>

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<sup>4</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2017; Interview with CSO Activist, Koidu, 1 February 2017.

<sup>5</sup> Interviews with miners, Kono District, January – April 2017.

<sup>6</sup> Focus Group Discussion with Miners, Seidu, 12 April, 2017.

<sup>7</sup> Interviews with miners, Kono District, January – April 2017.

<sup>8</sup> Interview with miner, Seidu, 31 January, 2017.

<sup>9</sup> Interview with miner, Seidu, 31 March 2017.

It is this inherent risk of investing substantial time and resources and not recovering any stones at all, that has led to the re-emergence and spread of the wage labour mode of production in ASM, albeit on a non-industrial scale. Commonly called “Kosovo”, the wage labour mode is now the dominant form of production, and derives its name from the ethnic wars in the former Yugoslavia, invoking sentiments of struggle and survival, with each actor shifting the risks of their actions to others.<sup>10</sup> Although there are no formal or written contracts, the wage labour mode of production involves labourers providing their labour freely to a miner or supporter to work on an agreed plot(s) of land, for an agreed wage – usually Leones 25,000 per plot. Depending on the agreement, payment can be made on a daily, weekly or monthly basis.

Our research revealed that many young miners were attracted to the wage labour mode of production because it allowed them to decide where and when to work, with an assurance of being paid a wage, regardless of whether or not diamonds were found. However, this arrangement deprived them of any valid claim to the diamonds; by agreeing to work for a wage, they relinquish any right to the proceeds. In many of the mines we visited during our fieldwork, labourers insisted on being paid a daily wage, given that this reduced the risk of not receiving a wage after a week or month, should the owner or supporter of the mine decide to stop operations abruptly.<sup>11</sup> “Kosovo” wage labour as currently practised in the mines, has clear similarities to Zack-Williams’ analysis of the “tributor-supporter” system, with one of the differences being the scale of operations. Moreover, while the SLST’s brand of wage labour grew out of the need to maximize the dividend of shareholders out of the abundance of diamond deposits, in the process excluding labourers, current day wage labour has emerged from the fear of the associated risks of not finding diamonds, due to vastly depleted deposits. This illustrates how previous diamond production patterns and the incentives underlining them have shaped, and continue to shape, relations in ASM, decades after SLST and its successor, the National Diamond Mining Company (NDMC) stopped operations.

In addition to the crowd funding and wage labour modes of diamond production, we also identified a third category of labour arrangement – the hybrid mode. Under this mode, a flexible arrangement allows labourers to switch from one mode to the other, depending on their individual or collective circumstances. With the hybrid mode of production, for example, crowd funding miners/labourers could decide to temporarily work for wages for a supporter, in order to raise funds to buy mining equipment, pay for a mining licence, or generate the school fees of their children, before eventually returning to their own operations.<sup>12</sup> As is the case with the wage labour mode of production, labourers work for a wage on agreed plots of land, but with no legal claims to the diamonds. However, the arrangement also allows them to go directly to dealers and serial supporters to solicit one-off support, with an informal and non-binding commitment to sell them diamonds in the event that any are recovered. One miner practising the hybrid mode clearly explained the rationale for not having any firm commitment with dealers and supporters:

Today, we can decide to work on our plot, but if we don’t have money to buy food or pay for medicines, we can go and do “Kosovo”, even if for a day, and come back. Sometimes, we go to Koidu, and seek support from dealers who usually buy our diamonds; and if we are lucky, we will buy all what we need and come back. It is like an insurance policy.<sup>13</sup>

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<sup>10</sup> Interview with CSO Activist, Koidu, 1 February 2017.

<sup>11</sup> Interviews with miners, Kono District, January – April 2017.

<sup>12</sup> Interviews with miners, Kono District, January – April 2017.

<sup>13</sup> Focus Group Discussion with crowd funding miners, 7 November 2017, Seidu.



The ability of a he miner to “straddle” various modes of production serves as an insurance policy, and underscores the high burden of risk generally associated with ASM. Thus, while switching from crowd funding to Kosovo does not necessarily accord miners an opportunity to “get rich quick” (Banchirigah, 2008: 29), it nonetheless affords them immense agency and flexibility for their continued participation in artisanal mining, while simultaneously engaging in other livelihood activities such as agriculture (Maconachie 2011; Maconachie and Binns 2007).

### **Contesting discourses of the drivers of mechanization**

In addition to changes in the mode of alluvial diamond production in the post-war years, this labour reconfiguration has been simultaneously accompanied by a scale of mechanization never before observed in the subsector. The increasing application of heavy machinery in ASM, has accelerated the weakening of previously dependent relationships in the mines. While machines such as excavators and caterpillars have not completely replaced labourers, and are unlikely to do so in the foreseeable future, they have nonetheless led to a reduction in their roles, as well as the depreciation of the value of their labour.<sup>14</sup>

As previously noted, although the use of machines was permitted in the 1950s after the SLST relinquished less productive areas of its concession to the diamondiferous chiefdoms of Kono, by default, it was only few miners – mostly Lebanese dealers –who could afford their use. Government of Sierra Leone (GoSL) officials, civil society activists, miners, supporters and dealers interviewed for this study repeatedly claimed that the depletion of shallow diamond deposits, had rendered the use of rudimentary mining tools redundant, necessitating the use of heavy machinery.<sup>15</sup> One very knowledgeable informant who had more than 30 years of experience in the mining sector, went as far as to estimate that only between 10 and 15 per cent of alluvial diamond deposits remained in the ground.<sup>16</sup> This estimation is clearly not based on any official study, but on his insights and personal observation of the scale, rate and diamond extraction strategies of the NDMC in the 1970s-80s, when he worked for the company. Indeed, it remains impossible to scientifically estimate the extent of current alluvial diamond deposits, since much of the available geological data is obsolete and unreliable (Goodenough, Jones and Ford, 2018). The last comprehensive nationwide geological survey was carried out in 1967,<sup>17</sup> and at the time of our fieldwork, the results from a World Bank funded nationwide airborne geological survey were still pending.<sup>18</sup> Thus, in the absence of any reliable geological knowledge, miners must embark on a “hit-and-miss” exercise, an endeavour that has been described as a form of “casino capitalism”. Currently, the only known locations with any meaningful remaining diamond deposits are found in riverbeds and often at humanly inaccessible depths, particularly in areas previously earmarked as reserves by the NDMC. Such deposits can only be accessed through the use of machines.<sup>19</sup> This is the substantive narrative that has been produced and reproduced by the state and powerful actors in the artisanal diamond trade, pushing for the accelerated use of heavy machinery in the face of calls by the EPA and environmentalists to proscribe their use.

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<sup>14</sup> Interviews with miners, Kono District, January – April 2017; Focus Group Discussion with crowd funding miners, Seidu, 7 November 2017.

<sup>15</sup> Interviews with GoSL officials, Freetown, 9 April 2019; CSO activist, Koidu, 19 April 2019; Chairman Community Development Committee, Tankoro Chiefdom, Koidu, 18 April, 2019.

<sup>16</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2017.

<sup>17</sup> Interview with Senior National Minerals Agency official, Freetown, 10 July 2019.

<sup>18</sup> National Minerals Agency, 2019; Interview with Senior National Minerals Agency official, Freetown, 15 July 2020.

<sup>19</sup> Interview, former Production Manager, National Diamond Mining Company, Koidu, 20 March 2017.

There is no doubt that over the years Sierra Leone's diamond deposits have been significantly depleted, given that they are a finite and non-renewable resource. However, there is more to the mechanization of the sub-sector than the official and popular narrative suggests. First, despite the distinction often made in the literature between ASM and large-scale mining on the basis of the type of equipment employed in each category, most Sierra Leonean law does not expressly prohibit their use. For instance, the "Regulation to the Mines and Minerals Act 2009" notes that the purpose of an artisanal mining licence "...is to permit the exploitation of mineral deposits by labour intensive methods by Sierra Leonean citizens". The only formal document that clearly prohibits heavy machine use is a set of guidelines put together by the Ministry of Mines and Mineral Resources in 2013, providing guidance on the mining and marketing of alluvial minerals. The guidelines note that:

Heavy earth mining machines such as excavators, dredges etc., shall not be employed in Artisanal Mining Licensed areas and shall target alluvial deposits only (and not Kimberlite deposits). Pit depth shall be limited to 10m (Ministry of Mines and Mineral Resources, 2013: 3).

This is the closest one can get to having a formal document that prohibits heavy machinery in ASM, despite post-war mining reforms leading to the revision of laws, policies and the creation of new institutions to regulate the mining sector and the environment. Such reforms led to the creation of the Environment Protection Agency (EPA) in 2008, the National Minerals Agency (NMA) in 2012 and the enactment of the Mines and Minerals Act in 2009 (Government of Sierra Leone, 2008; 2009: 2012). One self-reflecting GoSL official that we interviewed claimed that post-war mining reforms were carried out in a way that "disrobed" newly established agencies such as the EPA and NMA and their associated legislations of any meaningful regulatory powers over ASM, especially on issues related to the environment.<sup>20</sup> In doing so, he suggested that politicians and their clients could not have allowed the state to secure complete control over the sub-sector, because it would have deprived them of a vital source of wealth. Elsewhere, it has also been argued that the bifurcated nature of the country's artisanal mining regulatory regime, whereby the NMA cannot interfere in pre-licencing processes controlled by chiefs, serves to keep part of the sub-sector out of formal state control (Maconachie and Conteh, 2021).

While a number of our informants noted that during consultations leading up to the enactment of the Mines and Minerals Act in 2009, civil society activists advocated for a ban on heavy machinery in ASM, these concerns were overshadowed by those of politics and business.<sup>21</sup> This strategy of the elite using ASM for wealth accumulation is also widely reported in Liberia, where officials make distinctions between personalised sources of revenue emanating from a highly informal ASM sub-sector, and "those accruable to the state", through small and large-scale mining (Maconachie and Conteh, 2019: 4). The result is that legal and institutional reforms become part of hollow rituals and instruments at the disposal of elites, designed to appease donors who continually push for reforms (Maconachie and Conteh, 2021). This is also indicative of the broad and sometimes indeterminate "spaces" within which human security battles are fought, won and lost – in this case, designing laws and institutions in ways that make them weak and easily exploitable by the powerful. Such a paradox clearly resonates with the argument that humans' interaction with the physical environment forms the basis upon which politics, laws and society are established and given meaning within a given political ecological context (Robins 2012).

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<sup>20</sup> Interview with senior GoSL official, Freetown, 7 February 2017.

<sup>21</sup> Interview with senior GoSL official, Freetown, 7 February 2017; Interview, former Production Manager, National Diamond Mining Company, Koidu, 20 March 2017; CSO activist, Koidu, 19 April 2019.

Further, while stakeholders in the artisanal mining sector have frequently made reference to dwindling alluvial deposits as the main driving force for the increasing use of heavy machinery, there are equally important incentives that are seldom discussed, as those who initiate, shape and control narratives remain silent about them. These incentives include efficiency in the production and security of diamonds. Mechanization has not only significantly reduced miners' reliance on labour production times, it has also reduced the need for, and cost of, labour, while simultaneously increasing the chances of diamond finds and their security in the mines.<sup>22</sup> Emphasizing the efficiency of machines and their environmental impacts, one local councillor who had been fighting illegal mining by Chinese miners in his ward in Kono District, noted:

A plot of land our people can mine for many years, the machines of the Chinese can only take a few weeks to do so. Backed by the chief and member of parliament, they don't employ our people and they destroy our environment in the process.<sup>23</sup>

The councillor's description of the use and impact of machines in his ward is not an isolated case. It is typical of the current state of ASM, as miners that are dependent on wealthy supporters and foreign investors for funding frequently employ heavy machinery to use on ASM plots. Indeed, at one large artisanal mine that we visited, there were more than 10 excavators in operation, with the use of labour limited to the transportation of gravel to be washed by locally fabricated washing machines. The use of washing machines which hitherto was exclusive to large and small-scale operations, has further enhanced the security of diamonds, limiting the chances of theft by diggers who wash the gravel.<sup>24</sup> Thus, while dwindling diamond deposits have forced diggers or labourers to embark on a process of risk rationalization, which ultimately pushes them towards a wage-based mode of production. Here, the use of machines is designed to limit their involvement in production, maximise production, undervalue their labour and secure diamonds. In the process, this also compromises labourers' economic and livelihood security. Simply put, although employing machines would on face value appear to be cost-intensive, it is a very cost-effective strategy for supporters and dealers.<sup>25</sup> This remains at odds with the widely held view that the cost of labour is an important determinant influencing mechanization (Priester et al, 2010), given that despite the availability of relatively cheap labour, miners backed by supporters still prefer to use more costly machines.

In addition to the advantages of efficiency and the increased security derived by miners, supporters and dealers from machines, their use has become instrumental in "impersonalizing" labour relations in the mines. This enables supporters and dealers to navigate the administrative challenges involved in managing a large workforce, as well as to avoid social security obligations. As one informant put it:

The boys [diggers] are difficult to control. Imagine having 50 or more of them on one plot; some will be fighting instead of working. With machines, you only need an operator to do the work. Also, because I only need labour for a limited time and type of work, I don't have any obligations beyond what I have to pay them on a given day.<sup>26</sup>

The fact that supporters and dealers in part resort to using machines as a strategy to deal with the, at times, uncontrollable behaviour of labourers<sup>27</sup> as well as abdicate their social security obligations

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<sup>22</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2019.

<sup>23</sup> Interview, Councillor, Sewafe, 22 March 2019.

<sup>24</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2019.

<sup>25</sup> Interviews, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2019; Councillor, Sewafe, 22 March 2019; CSO activist, Koidu, 19 April 2019.

<sup>26</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2019.

<sup>27</sup> Interview, Former Production Manager, National Diamond Mining Company, Koidu, 20 March 2019,

that accompany permanent working relationships, is not only insightful, but it also diminishes the weight one can place on the narrative of dwindling deposits for heavy machine use in ASM. Supporters and dealers' renunciation of social security responsibilities, which undermines labourers' long-term economic and livelihood security, is aided by the lean and ineffective presence of the Ministry of Labour in Kono, which is responsible for resolving labour and industrial disputes. At the time of our fieldwork, the Ministry had but one officer stationed in the District, who noted that because of the informal labour relations in ASM, he rarely focused on the sub-sector.<sup>28</sup> However, he did note that whenever he visited an artisanal mine, there were a number of issues that he was concerned about:

I would want to know if a particular miner had employed workers; and if he had employed workers, I would want to know their employment status, whether [they were being paid] a daily, weekly or monthly wage. I would also want to know if they were being paid according to the minimum wage sanctioned by the government in 2014.<sup>29</sup>

Critical to our analysis in this paper, is the role or lack thereof of state regulation related to labour relations in ASM. Here, we are reminded of how the failure of the state to intervene and reform informal labour relations, resulting from its lack of capacity, reinforces informality. Beyond their use for efficiency and security purposes, machines have become objects through which miners, their supporters and dealers navigate regulation, keeping diggers or labourers impoverished both in the short and long term. Elsewhere, as is apparent in Liberia, the unregulated use of machines has not only led to the exploitation of labourers, but it has led to the evolution of a new type of mining that is "neither artisanal nor small-scale" (Maconachie and Conteh, 2019). Such a situation has created challenges for the authorities, as they grapple with the question of how best to react to the growing use of machines in the sub-sector, as we will discuss in the next section.

### **Government's response to mechanization of ASM**

For many years, the government's response to the increasing prevalence of mechanization within the ASM sector has been uncoordinated. This has largely been due to differences in strategy between the EPA and the NMA in how to maintain a balance between sustainable resource extraction and the creation of incentives to attract investors to the sector. In turn, the lack of a coordinated strategy has made it difficult for the two institutions to forge a common approach in addressing the environmental and human security challenges posed by mining. To provide one example, while NMA officials have always argued that the EPA should exempt exploration companies from paying environmental impact assessment (EIA) fees because they are not actively involved in mining, EPA officials have argued that the calculation of EIA fees is based on environmental impact, regardless of the type of activity. Nonetheless, this situation was to quickly change after the election of President Julius Maada Bio of the Sierra Leone People's Party (SLPP) in April 2018. As part of the process of reforming the mining sector, the use of machines has become a key issue in discussions related to ASM policy; and the government's policy actions related to machine use since 2018 have been shaped by actors and institutions with both complementary and competing interests in the sector. President Bio's appointment of Dr Morie Manyeh, Professor Foday Moriba Jaward and Julius Mattai in 2018, to head the Ministry of Mines and Mineral Resources, the EPA and NMA respectively, led to a significant shift in the government's approach. This resulted in increased collaboration between the EPA and NMA, allowing them to successfully place a ban on the use of machines in ASM in mid-2018.

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<sup>28</sup> Interview, Senior Labour and Employment Officer, Kono District, 18 April, 2019.

<sup>29</sup> Interview, Senior Labour and Employment Officer, Kono District, 18 April, 2019.

Manyeh, a native of the country's most diamondiferous district, Kono, served for years as the SLPP's national chairman. Jaward, on the other hand, served as a professor of the environment at a local university, and together with Mattai, is believed to be close to the President given their days together at the Bo Government Secondary School. One civil society activist in Kono noted that the three officials were influenced by the level of destruction they saw when visiting a Chinese operated artisanal mine in Kono.<sup>30</sup> Given the power and influence of diamond dealers, coupled with the fact that chiefs and many of the country's elite widely use machines in artisanal mining, many youths in Kono agreed that the ban would not have been successful were it not for Manyeh's "emotional connection to the land of his people", and the influence of Jaward and Mattai<sup>31</sup> Indeed, the dove-tailing of institutional mandates with a reliance on informal relationships to influence government action is, in many ways, reflective of how institutions and decision-making work in Sierra Leone, with informal networks playing a significant role (Conteh 2017; Harris and Conteh 2020).

However, the ban on machine use in ASM was short-lived, and was lifted a few months after its implementation, as the Diamond and Gold Dealers Association (DGDA) successfully lobbied the government to reverse the decision.<sup>32</sup> Despite the country's progressive yearly increase in the export of rough diamonds, amounting to slightly over US\$157 million in 2018—a 25 per cent increase in the 2017 export of US\$122 million (Kimberley Process 2018) – the DGDA successfully convinced the government through the Ministry of Finance that the ban had led to a decrease in alluvial diamond production. It is worth noting that the practice of diamond dealers and exporters subtly or overtly exerting pressure on government officials to influence policy directions in ways that benefit them, while limiting opportunities for the state, ordinary artisanal miners and diggers, is not a new development. A striking example of this trend relates to the belief among some officials that the exceptional delay in the passage of the draft Precious Minerals Trading Bill of 2012 into law, was largely due to the "corrupting" influence of dealers and exporters who feared that the enactment of the bill " [would] wrestle control of the diamond trade from them" (Maconachie and Conteh 2021:40-41). These fears were strengthened by the fact that the bill addressed entrenched poverty in ASM by fundamentally shifting its support towards ordinary miners, while favouring the generation of more revenues for the government (Maconachie and Conteh 2021).

One EPA official who attended a meeting called by the Minister of Finance to discuss the ban after the DGDA's intervention noted that the minister, "...was not interested in hearing technical arguments related to the environmental damage caused by artisanal miners using heavy machines", adding that he was told "to turn a blind eye" to the situation.<sup>33</sup> Before this period, authorities could not act to prevent the use of heavy machine in ASM. This in-action played a role in re-enforcing narratives framed around the lack of clarity in law or otherwise, with the emergence of officials willing to act in ways that protected mining communities' environmental security; economic imperatives supersede environmental considerations and political connections.

As we have seen, the government faced the dilemma of mediating the different and complex needs of different actors in the sector. Although it could not continue enforcing the ban, the NMA nonetheless saw an opportunity to regulate the use of heavy machines by proposing the introduction of fees for artisanal miners intending to use them. A draft NMA concept note proposed that artisanal miners wishing to use excavators, should pay US\$ 2000 per annum (National Minerals Agency. n.d: 3). Although the proposals have not yet been implemented, civil society activists remain concerned that

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<sup>30</sup> Interview, civil society activist, Kono, 19 April 2019.

<sup>31</sup> Focus group discussion with youth, Tankoro, 18 April 2019.

<sup>32</sup> Interview, senior official of the NMA, Freetown.

<sup>33</sup> Interview senior official of the EPA, Freetown, 7 June 2019.

decision-making related machine use in ASM, has been conducted with little or no input from mining communities suffering the brunt of environmental degradation and loss of livelihood security.<sup>34</sup>

Further, a new draft bill intended to amend the Mines and Minerals Act 2009 has emerged, which formed the basis for “consultations” with mining communities in early 2020. The bill seeks to redefine and recategorize artisanal mining in line with the Artisanal Mining Policy 2018 and Minerals Policy 2018, rather than reimpose a ban on machines in the sector. Under the proposal, artisanal mining will be subsumed under the category of small-scale mining, creating a broad classification of mining with three subcategories—small-scale mining licence category C, previously artisanal mining; small-scale mining licence category B; and small-scale mining licence Category A. In the three categories, operators will be allowed to use machines to increase productivity, with the biggest difference being the size of permissible mining plots.

In essence, what the bill seeks to do is legalise an illicit situation that has been going on for decades, with policy finally catching up with practice. This is perhaps not surprising, as it will only accelerate the government’s efforts to attract large-scale investors to the mining sector, which has been its main focus in the post-war period. One potential implication of this shift though is that typical artisanal miners would be excluded from a sector that has long provided their livelihoods, as their trade is progressively co-opted into the mainstream mining sector (large-scale mining). This is largely due to the fact that by confining category C small-scale miners to specific spaces, the government can easily tax them (Engwicht and Grabek, 2019), a move that will dislocate many of them. The proposed changes will not deal with the human security challenges that increased machine use will continue to pose for communities whose existence depends on mining. In fact, as will become apparent in the next section, the policy shift illustrates the powerful influence that industry has on the policy options of developing countries’ governments. For the first time, ASM, which was previously regarded as a basic source of livelihood, is now being disproportionately viewed from a perspective of revenue generation for the government.

### **ASM, mechanization and the worsening human insecurity in mining communities**

To summarize, several decades of mining in Sierra Leone have left many of the country’s mineral rich communities improvised, further exacerbating their human security challenges. Focusing more specifically on environmental security, one study funded by the European Union has identified mining in Sierra Leone as the third most significant direct cause of land degradation, after logging and firewood collection (Blinker, 2006). In relation to ASM, another study has noted that the subsector is “believed to have negatively impacted over 40% of the country’s estimated 7,700 square miles of diamondiferous land in the south-east” (Nimba Research and Consulting 2015: 15). While it is almost impossible to estimate the extent to which mechanized ASM contributes to the multidimensional human security challenges posed by mining, it is reasonable to assume that because of its potential to cause significant environmental destruction to large parcels of land at great speed, its adverse impacts are potentially devastating.

In short, our engagement with civil society activists working to prevent extractive-related conflict in Kono has pointed to the growing mechanization of ASM as an accelerator of the depletion of arable land. This, in turn, has exacerbated the tripartite competition for land among artisanal miners, farmers and cattle breeders.<sup>35</sup> Broadly speaking, artisanal miners have refused to reclaim mined-out areas, shifting the responsibility of reclamation to the NMA, whose licence fees, they argue, provide for land

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<sup>34</sup> Interview, civil society activist, Kono, 12 August 2020.

<sup>35</sup> Interview, COS activist, Kono, 12 August 2020.

reclamation (Planning Green Futures, 2016). Such an absence of a functional land reclamation programme has led to the flooding of vast mined-out areas, leading to environmental and health hazards, including the drowning of a significant number of children in Kono and Tongo Fields in the east of the country.<sup>36</sup>

The twin challenges of land degradation (given the lack of organized land reclamation programmes) and the mechanization of ASM (which has led to the undervaluing and underutilization of labour) have had a significant impact on the livelihoods of mining communities. It has been suggested that “with less and less land available for agriculture and other productive economic uses, 8 out of 10 people in mining communities live in abject poverty” (Nimba Research and Consulting 2015: 15). The situation is particularly dire for the elderly, who have been dependent on agriculture for their livelihoods, but have been unable to switch to alternative forms of livelihoods as land becomes unavailable. As production modes in ASM continue to evolve in ways that adversely affect livelihoods, youths, more than other section of society, have been able to adapt to such social changes. For example, they have been able to join the rapidly growing motorcycle taxi trade in West Africa (Fortune et al. 2015). This sector emerged immediately after the war as a thriving economic activity that absorbed ex-combatants (Andie and Denov, 2017), but also quickly become attractive to youths who were marginalised and disenchanted in the ASM sector. As one youth put it during a focus group discussion:

Before now, when hand-mining was widespread, it was encouraging for youths to stay in the mines. Because if you want to mine, you will employ people and pay them daily and you will also be responsible for their feeding. But now that the machines are here, they make work go fast and it costs less than using man power. That is the reason why so many youths have left for bike riding.<sup>37</sup>

However, the transition of youths from the mines to bike riding has not always been a smooth one. While many youth consider the motorcycle taxi trade as an alternative to the exploitative employment relations in ASM, for many, it is a matter of substituting one informal space for another. Focus group discussions with motorbike riders recounted stories of paying bribes to the police and in some cases being involving in running battles with them for lack of licences, and risking their personal safety and that of their passengers.<sup>38</sup>

In addition, although industrial or large-scale mining previously provided the “sole source of violent conflict in the Sierra Leonean diamond sector” (Engwicht and Grabek, 2019: 194), we found a case that indicates that mechanized ASM is fast becoming a new source of violent conflict in the sector. The case of the artisanal Chinese mine noted earlier, deserves particular mention because of the multiple human security challenges it poses for the nearby community. Although widely believed by the community to enjoy the backing of the paramount chief and local member of parliament,<sup>39</sup> the Chinese had set up a mining camp and installed washing plants, partially diverting and polluting the river supplying water to the host community.<sup>40</sup> Further, the diversion of the river not only deprived the community of potable water, but it destroyed the rice of farmers in nearby swamps, “forcing the community to attack the camp of the Chinese, destroying their makeshift structures and equipment,

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<sup>36</sup> Interview, CSO activist, Koidu, 17 April 2019.

<sup>37</sup> Focus group discussion, bike riders, Kono: 17 April 2019.

<sup>38</sup> Focus group discussion, bike riders, Kono: 17 April 2019.

<sup>39</sup> Interview, Councillor, Sewafe, 22 March 2019.

<sup>40</sup> Interviews, Councillor, Sewafe, 22 March 2019; CSO activist, 17 April 2019.

endangering their personal security.”<sup>41</sup>). Peace was only ultimately restored with the deployment of the police and the subsequent arrest and deportation of the Chinese miners.

This case involving Chinese artisanal miners, who were reported to be aided by chiefs and other powerful figures, is by no means an isolated incident (see Maconachie and Conteh 2021). In their defence, one senior paramount chief noted that “while I cannot deny the involvement of some of our colleagues in illegal Chinese activities, no chief will welcome them to his chieftom without instructions from Freetown.”<sup>42</sup> The chief’s acknowledgement of their involvement and that of officials in Freetown, illustrates their complicity not only in the illegal exploitation of communities’ resources, but the destruction of their livelihoods in ways that expose them to long term human insecurity challenges. This is an apt reminder of the need to frame the discourse of human security not only around the security of the state, but also around the individual.

## Conclusion

Artisanal and small-scale mining has evolved significantly since it was first officially permitted by the colonial government in the mid-1950s. While ASM has for decades provided a major source of livelihood for Sierra Leoneans, and indeed foreign nationals, the control over its modes and patterns of production has been shaped and reshaped over time by economic imperatives that prioritise the interests of the elite and the state over the human security of the individual and mining communities. In fact, ASM itself was only sanctioned by the colonial government to boost diamond production and export, a strategy that allowed the SLST, and later the NDMC to meet targets, while simultaneously reducing production costs. It has become apparent that the current sub-divisions of the mining sector into artisanal, small-scale and large-scale, have striking parallels with the colonial era configurations of industrial mining firms and individual based ADMS operations, which Zack-Williams described as capitalist and non-capitalist modes respectively. However, as ASM has evolved, it has gradually adopted capitalist features including the use of machines, and attracted vast sums of local and foreign capital, in the process undervaluing labour’s contribution to production and share in the proceeds. This explains the current unpopularity of the tributor-supporter labour relationship, which for decades defined production relations in ASM. It also sheds light on the growing popularity of the wage labour mode or “Kosovo”, as diggers opt to “sell” their labour in exchange for wages, with no stake in the proceeds.

While there is no doubt that dwindling alluvial diamond deposits have accelerated the pace of heavy machine use in ASM, it is a narrative that has often been over-emphasized to mask other less obvious but instrumental drivers of mechanization. The mechanization of the sector has enabled dealers and the elite to effectively retain control of production patterns, as well as evade responsibility for the protection of the security of individual diggers and mining communities. Although the acceleration of the pace of mechanization in ASM is boosting diamond production and export, providing significant revenues for some miners, dealers, exporters and the government, in the short-term, it has also contributed to the devaluation and dislocation of labour, in addition to the destruction of livelihoods in mining communities. Simply put, the mechanization of ASM has produced, and will continue to produce, clear winners (miners, dealers/exporters, government) and losers (diggers and mining communities). The ongoing process of recategorizing ASM is unlikely to produce any meaningful safeguards for the protection of the human security of individuals and communities, whose lives depend on mining. If anything, “it will kill artisanal mining” as one senior government official noted.

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<sup>41</sup> Interviews, Councillor, Sewafe, 22 March 2019; CSO activist, Koidu, 17 April 2019.

<sup>42</sup> Interview, paramount chief, Koidu, 24 April 20219.



The majority of artisanal miners cannot afford to pay for the use of machines, and this will pave the way for rich Sierra Leoneans and foreign nationals to expand their participation in the sector, while pushing poor miners and diggers further into the margins and poverty. The multi-dimensional impact of mechanized ASM is already taking its toll on individual diggers who have had to abandon ASM mines for equally risky trades, such as motorbike taxi riding, as a means of livelihood substitution. The elderly remain particularly at risk of being pushed out of farming due to the lack of a meaningful land reclamation programme. Equally, communities' personal security continues to be undermined, as children drown in flooded areas caused by mining and tensions flare up between communities and mechanized ASM operators, as we have seen with the case of the Chinese.

Ultimately, the findings of this paper have significant implications for policy and the very future of artisanal mining in Sierra Leone. Our intention is by no means to make an "anti-mechanization" case. Rather, it is to call for a policy-making process that is informed by grounded evidence. A shift in policy and law that is likely to have the kinds of human security impacts currently unravelling in ASM communities, should be preceded by a grounded, cost-benefit analysis, in order to determine the potential winners and losers, and to inform sustainable design and implementation. In the absence of a cost-benefit analysis, the change in policy can be gradually implemented through a piloted scheme that can iteratively provide learning to inform a nationwide roll out. Only then will it be possible for the potential adverse risks to be mitigated, and for a much wider segment of society to benefit from the country's diamond resources.

### **Acknowledgements**

The authors are grateful for the financial support for this work from Humanity United, under grant number IN11037/16PROJ, "Community Participation and Natural Resource Transparency in Post-conflict West Africa."

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