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Key Points

- In Sierra Leone, the use of diamond revenues to fuel civil war has ceased, but the environmental and socioeconomic effects of 75 years of artisanal diamond mining remain. Vast expanses of land have been stripped of topsoil, churned up, and abandoned, leaving the land barren and useless. This unproductive land represents a significant loss of potentially valuable agricultural production and livelihoods.

- Despite diminishing returns, thousands of diggers expose themselves daily to serious health and safety hazards in artisanal mining pits in the hopes of finding a diamond that might end their poverty.

- The revenues that government and traditional leaders collect from granting diamond mining licenses discourage them from considering whether an area would be better put to other uses.

- To date, the government has not used the portion of mining license fees legally designated for land reclamation for its intended purpose nor has it taken responsibility for ensuring that mined-out land is reclaimed.

- FESS's work in the artisanal diamond mining areas of Sierra Leone has shown that land reclamation can be successful, but it requires cooperation and commitment forged through extensive community consultations.

- The government of Sierra Leone should signal its commitment to the well-being and security of diamond-mining communities by adopting policies in support of community-based land reclamation as part of an integrated program of sustainable natural resources management.

Improving Environmental Security in Sierra Leone: The Importance of Land Reclamation

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The link between environmental degradation and human insecurity is starkly evident in Sierra Leone, one of the world's poorest countries. As in much of the developing world, many Sierra Leoneans depend on land-based livelihoods, including farming, fishing, forestry, and hunting. However, years of intensive mining in the country's diamondiferous regions have resulted in many abandoned sites that have left large tracts of degraded land. In addition to the enormous health and safety risks posed by the abandoned pits, the unproductive land represents a significant loss of potentially valuable agricultural land in this country where rapid population growth is increasing the pressure for livelihoods, land, and food. The gap between the needs of the population and the availability of such necessities is becoming increasingly untenable. The lens of environmental security allows us to see clearly how such a situation can threaten the continued peace and stability of an already fragile state.[1]

The environmental security perspective is especially useful in the Sierra Leonean context, as it allows us to examine the ways in which the social and environmental problems caused by land degradation in the country's mined-out diamond producing areas have the potential to cause instability in the absence of efforts to return the land to productive use. This *Issue Brief* argues that Sierra Leone must incorporate an environmental security approach into its post-conflict development strategy, specifically by taking steps to decrease the negative impact of abandoned and mined-out land on local communities. By doing this, the country will be not only addressing pressing environmental issues, but also enhancing the long-term viability of agricultural production and food security, thereby reducing the chances that conflict will resume.

To this end, the Foundation for Environmental Security and Sustainability (FESS), with funding from the Tiffany & Co. Foundation and the United States Agency for International Development, is implementing a project that addresses the challenge of reclaiming mined-out areas. Benefiting from the input and support of local communities, the FESS project is designed to return currently unusable land back to productive use, thereby increasing the livelihood opportunities and

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agricultural yields in communities facing environmental degradation and food insecurity.

Background

In December 2006, Sierra Leone and conflict diamonds were once again thrust into the international spotlight, thanks to the Hollywood film *Blood Diamond*. The film dramatizes the role diamonds played during the civil war that raged in the country from 1991 to 2002 (diamonds both financed and fueled the conflict). In some ways, the attention drawn to the issue of conflict diamonds by the movie has been beneficial, especially in that it has raised public awareness of the accomplishments of and gaps in the Kimberley Process, which seeks to reduce the number of conflict diamonds in the world market.[2] Despite some inadequacies in the Kimberley Process, governments, civil society, and diamond companies have done much to improve the traceability of gemstones. No one can be 100 percent certain of the origin of a stone; nevertheless, diamonds are no longer fueling armed conflict in Sierra Leone, and conflict diamonds are estimated to represent less than 1 percent of diamonds on the world market (Partnership Africa Canada n.d.).

Although conflict diamonds are not currently a cause for concern in Sierra Leone, the legacy of diamond mining still represents a potential threat to the stability of the country. Mining of alluvial diamonds has left extensive areas of land both depleted of minerals and unproductive for other purposes. And, while it is important to acknowledge that diamonds can play a crucial role in the development of Sierra Leone's economy and thus in the prevention of conflict driven by economic need, unless mining practices are changed, the side-effects may mean increased strife.

Tradeoffs

Continuous improvement in the country's human security situation—which in Sierra Leone goes hand-in-hand with effective management of the country's diamond resources and raising the living standards of miners and their communities—will be essential to the future security of the country. However, despite the general awareness within communities of the many hazards associated with alluvial diamond mining, thousands of diggers and members of the surrounding communities expose themselves to increased health and safety risks every day. Laborers and mining communities suffer from high incidences of drowning and disease brought on by human and animal waste that collects in mining pits. Although malaria is a problem throughout the country, the close proximity of water-filled pits to human settlements puts mining communities at higher risk (IRG 2005). Those working in and

Artisanal diamond mining pits and pools of water in Tankoro Chiefdom, Kono.

living near the pits also are more likely to be exposed to schistosomiasis and typhoid.

The physical environment also has sustained extensive damage as a result of mining. In Sierra Leone, as elsewhere in West Africa, the alluvial nature of diamond occurrences and associated artisanal extractive practices contribute to widespread environmental degradation and loss of productive land surface. The extensive and shallow riverine deposits containing diamonds are accessed easily by individuals using simple tools such as shovels and pick axes. Over the more than 75 years since diamond mining began in Sierra Leone, vast expanses of land have been stripped of topsoil, churned up, and abandoned with virtually no efforts to refill holes and render the land viable for other purposes. Deforestation is accelerated as trees and vegetation are indiscriminately cut down for fuel, shelter, and to clear the area for excavation (IRG 2005). In the case of commercial kimberlite mining, excess sediment from mining operations pollutes water and endangers the survival of aquatic plants and fish species. Air pollution is also a problem, as blasting and loosening of the earth kicks dust into the air, creating respiratory problems. In some communities near the blasting sites, noise pollution has been so intense that it has forced schools to close.

The environmental damage in mining areas is exacerbated by recurrent "gold rushes." Whenever a new area is found to contain stones, it soon swarms with diggers, who can produce much environmental devastation in a short time before moving on to a newer site where stones have been discovered (IRG 2005). These in-migrations not only intensify mining activity, but also bring large numbers of people whose presence strains the already limited supply of food and available land. Understandably, the government seeks revenues from mining licenses; however, licenses are sometimes granted after diggers are already actively mining and without prior consideration as to whether the area is likely to have viable long-term extractive potential or would be better put to other uses (IRG 2005). This cycle leads to an ever-expanding stock of degraded land.

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Perhaps most importantly, in a country with a severe food security problem, diamond mining is destroying nutrient-rich soil and taking it out of productive agricultural use. Sierra Leone's growing population is already unable to feed itself. In 2004, the Food and Agricultural Organization of the United Nations (FAO) estimated that 2.4 million, or 50 percent, of Sierra Leoneans were undernourished (FAO 2004).

The situation appears to be getting even worse, as agricultural output, which is growing at 1.7 percent per year (FAO 2004), is failing to keep up with a rapidly growing population. Annual population growth is reported to be between 3.5 percent (World Bank 2007) and 4.1 percent (United Nation Statistics Division n.d.). Such a wide range may be due to the difficulty of collecting data in Sierra Leone given the lingering effects of war, the rugged topography, and the lack of adequate roads. Although agricultural production has increased as many Sierra Leoneans have returned to their farms after the conclusion of the civil war, the country is still worse off than before the war, as high food imports and continued dependence on food aid attest. According to FAO (2000), prior to 1990, Sierra Leone was almost food self-sufficient; indeed, the country had been a net exporter of rice in the 1960s (Verheye 2000). Between 1998 and 2000, Sierra Leone imported 50 percent of its total cereal consumption (WRI 2003). Part of the increase in imports may be explained by the fact that some farmers switched from producing rice to producing roots and tubers during the war; in any case, the reality remains

that Sierra Leone is largely dependent on other countries to feed its population.[3]

Despite these problems, however, it is easy to understand the country's continued attachment to diamond mining. For desperately poor people, diamonds carry a certain mystique related to the dream, or the illusion, that anyone can get lucky, find a big stone, and become rich. More practically, along with bauxite and rutile, diamond exports make up the primary source of hard currency earnings and investment in the nation. Prior to the civil war, diamond exports accounted for 70 percent of foreign exchange earnings (River Diamonds 2004). Neither agriculture nor bauxite and rutile mining have fully recovered since the war; accordingly, diamonds still represent the lion's share of Sierra Leone's export earnings.

Since the conclusion of the civil war and the inception of the Kimberley Process, Sierra Leone's legitimate diamond export earnings have increased from nearly nothing in 2001 to more than US$140 million in 2005 (PAC 2006). In its southeastern region, Sierra Leone has an estimated 7,700 square miles of diamondiferous land (Kanu 2006). Although there are signs that many areas are no longer producing the quantity of alluvial diamonds that they once did, new areas are coming into production. In Kono District, four more chiefdoms have recently been declared diamondiferous. It is clear that despite the associated problems, including poor working conditions, health and safety issues, and environmental damage, diamond mining will continue in Sierra Leone well into the future. This will inevitably mean greater environmental damage if the consequences of mining are not adequately addressed.

In order to ensure the continued peace and development of Sierra Leone, the country must balance mining, which brings in badly needed foreign exchange, with other economic activities. Although Sierra Leone is attempting to diversify its economy, in the near term it will have to rely primarily on agriculture, as the industrial sector is very small and unable to generate much income or absorb a significant amount of labor. This situation will only increase in urgency, given that the rapidly expanding population will require more food and livelihood opportunities in the years to come.

Broken Promises

Technically, everyone from artisanal miners to corporate operators are required by law to remediate the land, but the pits left behind when miners move on speak to a different reality. This is a huge problem for Sierra Leone, where three-quarters of the country is currently undergoing some type of mineral exploration (IRIN News 2006).[4] Not all of the land under mineral exploration or exploitation is ideal farmland; however, those areas that are amenable to agricultural production must be made farmable again if Sierra Leone is to tackle the problem of feeding its citizens. Putting this land back into agricultural use is one important way that Sierra Leone can provide jobs for the massive numbers of unemployed youth who represent a potential threat to the stability of the country.

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Additionally, the country can no longer sustain its over-reliance on food imports, which robs it of foreign exchange—money that is badly needed for other priorities such as health, education, and transportation. Expanding the agricultural capacity of the country will be essential to national development.

Converting mined-out, pitted land is a difficult, expensive, and time-consuming task. As for the estimated 120,000 to 150,000 artisanal miners, who on average barely make two dollars per day, requiring them to spend their time filling in holes without compensation raises both practical and ethical

questions. For each artisanal mining license, the government levies a fee, a percentage of which is earmarked for land reclamation activities. However, it is clear that the government has neither used this money as intended nor taken responsibility for reclaiming mined-out land. Additionally, the government is doing little to ensure that corporations operating in the country are fulfilling their environmental obligations. Eager to attract and keep investors, the government has little incentive to pressure large-scale mining operators to carry out land reclamation projects.

Regardless of who carries out reclamation, it is essential that some effort be made to restore the long-term environmental viability and productivity of mined-out land. Increasing the food supply and putting people back to work will go a long way toward ensuring that Sierra Leone remains peaceful. The government must start now to take active steps to increase agricultural production while decreasing the health and environmental impacts of mining. In doing so, it will ensure that the benefits the country gains from mining are not outweighed by the environmental damage and subsequent food insecurity that extensive land destruction will bring.

Challenges to Moving Forward with Reclamation and Alternative Use Projects

The fact that 75 percent of the country is currently under mineral exploration is, in part, a result of strategic efforts by the Sierra Leonean government to stimulate the post-war economy through foreign and national investment in the mining sector.

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Undoubtedly, some of this exploration will lead to new finds of diamonds, rutile, bauxite, and gold. Although most of the new operations will involve large-scale deep mining rather than alluvial mining, land degradation will be an issue in these cases as well. If the current pattern holds, this increased mining activity will create an additional need for land reclamation, as more of the country's agricultural land is mined and degraded.

At the same time that new mines are being brought into production, many old mining sites remain unproductive and thus apt for reclamation. Despite the urgent need, however, land reclamation and alternative use projects are impeded by a number of obstacles. The sheer quantity of land in need of reclamation is daunting. Moreover, there are multiple interrelated forces that present challenges for project planning and implementation, including the economic pressures facing rural mining communities; sociocultural and legal structures that create unfavorable incentives to cease mining; and the need for an integrated approach to land reclamation that requires significant levels of community commitment and support in diamond mining areas where institutional resources are limited.

Economic hardship

Sierra Leone is ranked 176th on the 2006 UNDP Human Development Index. This makes the country the second poorest in the world, after Niger (UNDP 2006). Such grinding poverty gives thousands of diggers a strong incentive to continue mining—even on land that is no longer productive. From discussions with local people in diamond mining communities, it is clear that the prospect of finding just one more diamond is enough to keep people going back to areas that in the past have been known to yield diamonds. Much like the hope of winning the lottery, there is a strong belief among miners that finding one large diamond will be enough to provide for their families well into the future. However, for most laborers their returns amount to little more than a few cups of rice and either a small wage or the promise of a share in future earnings; they never score the big one. Even when they find a substantial diamond, diggers often get cheated because they have limited or no knowledge of

the monetary value of diamonds on the global market.

Compounding these problems is the fact that diamond-producing areas act as magnets for migrant workers from other parts of Sierra Leone and neighboring countries. Many of these laborers have tenuous, if any, ties to the mining communities in which they work and, consequently, relatively little investment in or concern for the long-term impact of their mining practices. Their primary motivation is to feed themselves and their families.

As productivity declines at a site, diggers create deeper and wider pits and trenches, hoping that more intensive activities will yield more diamonds, thus exacerbating the long-term negative consequences for the environment and human well-being. Even where productivity has declined, or even ceased, the tendency is to either continue digging long after the site is virtually depleted of alluvial diamonds or to abandon the site and resume digging in it after a period of a few years. The persistence of the diggers, driven by economic hardship, is bolstered in some cases by the local belief that diamonds are slowly but constantly working their way to the earth's surface. Individuals desperate to sustain themselves, and others eager to reap the benefits of diamonds, tend to show reluctance to give up on a once-productive site and declare it mined-out, because there is always the chance that the site will yield one more valuable diamond.

Built-in incentive structures work against reclamation

Laws, policies, and customary practices governing artisanal mining in Sierra Leone are contributing to the destruction of potentially productive land surface by creating perverse incentive structures for those with the authority to oversee the industry. Specifically, the incentive structure built into the licensing system encourages the proliferation of artisanal mining sites because paramount chiefs have both final authority to approve artisanal mining licenses and a financial stake in the number of licenses granted. A percentage of each license fee goes directly to the chiefs and a percentage of the diamond export revenues obtained by the government is given to communities through the Diamond Areas Community Development Fund. According to Lansana Gberie, a frequent writer on the subject of the diamond mining sector in Sierra Leone, 0.75 percent of the export value of the diamonds is redistributed to chiefdoms

Case Study: Kaisambo

In some places, reclamation is complicated by more than just theoretical questions about differing perspectives within communities. There is also genuine skepticism on the part of mining communities with regard to reclamation activities, as some previous attempts have gone awry. Kaisambo is a mining site in the Koidu area in Kono District that was designated to undergo a land reclamation project. The reclamation work was to require heavy machinery and therefore could be expected to be an expensive endeavor. Nevertheless, the choice of company was based on the lowest bid, and sources indicate that the selected company aggressively underbid to win the contract. The company ran out of money well before the project was finished, and there are varying accounts as to why this happened. Some observers say that the company had spent so much of its budget on payoffs to win the contract that there was little left for moving the earth. To make matters worse, people began re-mining the site. As the project was perceived to be a failure, and no broad-based community consultations had been held prior to the start of the project, it is a sore point in the area. One lesson of the project is the necessity of seeking community input. Had this project been bid fairly and awarded to the most qualified bidder, and also featured a community consultation phase, perhaps there would have been greater agreement as to whether the land was in fact mined-out. Because the project was begun without broad-based community consultation, it was viewed skeptically from the start, which undermined community support and a sense of local ownership for the project and may have, in turn, contributed to the re-mining of the site.

through the Fund in direct proportion to the number of mining licenses in a chiefdom (Gberie 2002). Aside from the problems of misappropriation, mismanagement, and low institutional capacities that plague the Fund, the conflicts of interest generated by this system tend to ensure the continued granting of licenses, even in mined-out areas and locations where continued digging threatens the environment.

Once the licenses have been granted, there also is an oversight problem, namely the lack of capacity of the Ministry of Mineral Resources to implement and monitor the situation at the numerous mine sites across the country. According to Gberie, the Ministry has been chronically neglected by the government. For instance, in 2002, the Ministry did not have a single official vehicle. Additionally, Mines Monitors are poorly paid and lack oversight, which encourages corruption and saps their motivation. The consequent lax enforcement of site mining bans means that sites can be re-mined without consequence to the diggers, a situation with adverse implications for the prospects of reclamation.

Land reclamation requires cooperation on many levels

To undertake a land reclamation project, there are a number of potential obstacles to overcome. First, community members must agree that discontinuing all mining activity in an area and reshaping the land for an alternative use is a worthwhile endeavor. The community must identify a tract of land, declare it mined-out, and make it available for reclamation. Reaching this point may be difficult, as there may be divisions and conflicting ideas within a community regarding the feasibility and implementation of reclamation.

Some potential points of contention may involve:

- Divergent opinions about the relative advantages and disadvantages of mining versus other livelihood activities, such as cultivation.
- Conflicting points of view about whether a given parcel of land is actually mined-out, meaning that the land has been exhaustively mined of diamonds.
- Competing interests regarding how the land may be used and benefits distributed once it is reclaimed.
- Concerns as to whether a particular reclamation project would serve to further the community's interests, given a history of unsustained efforts by various donor agencies in the region.

For a land reclamation project to be successful, there must be buy-in from the entire community, including everyone from the chiefs to the diggers. This requirement brings its own challenges, given the diversity and complexity of relationships within communities, the importance of including all stakeholders in decision making, and the need to avoid reinforcing unequal power relations (Cheney et al. 2002). All members of a community must anticipate benefiting in some way from the project, or there is a risk that individuals who feel otherwise will undermine the effort and possibly even begin re-mining the reclaimed area. To

Men and women work to reclaim mined-out land in Nimikoro Chiefdom, Kono.

overcome this obstacle, it is necessary to demonstrate that land proposed for reclamation has potential value as a site for agricultural production.

In addition to the sociocultural issues surrounding land reclamation projects, there are also key practical questions that must be addressed by any land reclamation effort, including:

- Who owns the land in question? (Sierra Leonean land tenure systems vary from one district or community to another, based in part on cultural traditions, and can involve overlapping systems that operate simultaneously).
- How will the land that is to be reclaimed be identified, and who will have a say in choosing the site?
- Whose cooperation is necessary to ensure that, once an alternative use is established for the reclaimed land, this will be a sustainable and productive activity?
- What is necessary to ensure that a community's commitment is sustainable over a period long enough to see tangible benefits of land reclamation, e.g., through one or more agricultural cycles, that will contribute to greater sustainability?
- Who will be responsible for monitoring the site over its lifespan? How will it be monitored?
- How much support will the mining sector and the Ministry of Mineral Resources offer the reclamation project? Will they commit to terminating the issuance of mining licenses for the land in question?
- Will it be possible to pressure larger mining enterprises to use best mining practices to rehabilitate and restore land to its pre-mining condition in order to allow for alternative uses?
- Who will be responsible for financing these projects?

Workers head home after a day of reclaiming land in Bompeh.

These questions all come back to the central issue of community buy-in and ownership. Without the support and active participation of the people most affected by land reclamation projects, these efforts are likely to fail.

Making Land Reclamation a Reality

To address the many challenges to undertaking land reclamation in Sierra Leone, the Foundation for Environmental Security and Sustainability (FESS), with a grant from the Tiffany & Co. Foundation and core funding from the United States Agency for International Development, has developed a project that involves communities in diamond mining areas in a program to recapture land otherwise lost to environmental degradation from artisanal diamond mining. FESS is employing a model of implementation that is community-based, community-directed, and community-monitored. This model is designed to give a deep sense of local ownership from the outset, avoiding some of the pitfalls common to projects that are designed and implemented by outside experts. Although the FESS project is in progress and not yet fully evaluated, it appears likely that the model can be adapted by other communities around the country to meet their specific needs as they reclaim land for alternative uses.

Designed to maximize local leadership and involvement, a

crucial early component of the FESS project was a series of consultative meetings and workshops held in diamond mining areas that are in clear need of reclamation. Two-day workshops held in Koidu and in Tongo Fields in February 2007 brought together local leaders, government representatives, and civil society groups to discuss the issues surrounding land reclamation activities and to assess local interest in and capacities for undertaking a land reclamation project. Each set of meetings ended with signed commitments from local stakeholders pledging their support and assistance for a project to be undertaken in their communities.

By March 2007, three demonstration sites selected by local communities were demarcated, and work is well underway to reclaim the land and prepare it for agricultural production by early summer 2007. Although challenges are expected along the way, FESS believes that this project will be successful and a positive step toward increasing livelihood options, improving food security, and protecting the environment in Sierra Leone. Because the project benefits from the input, support, and commitment of the communities in which the reclamation activities are taking place, this model has the potential to enable citizens of artisanal mining communities to lift themselves out of poverty as they take active steps to improve the management of their natural resources and environment.

Conclusion

Sierra Leone is facing serious challenges. The country's economic, physical, and social infrastructures were severely damaged by the civil war, leaving the majority of the population to fend for themselves and their families. Too often, this means attempting to eke out a living from artisanal mining, which not only does little to alleviate endemic poverty in the long run, but also damages the environment upon which 60 percent of the population relies for their livelihoods (FAO 2007).

Food insecurity is a severe problem today, as it has been since the beginning of the civil war. Despite the end of the conflict, the country continues to rely heavily on food imports and donations to feed its population. Food insecurity resulting in part from extensive environmental damage from decades of mining, combined with high unemployment and corruption, could propel Sierra Leone into renewed conflict.

By adopting an environmental security perspective that recognizes the links between improper mining, environmental damage, food insecurity, and conflict, the government of Sierra Leone may be able to institute policies that avert this threat. A top priority should be to change the structure of incentives that now favors land degradation by encouraging continued digging in already degraded areas. The government of Sierra Leone should signal its commitment to development and to the well-being and security of the population by adopting an explicit and sustained commitment to land reclamation as part of an integrated program of sustainable management of natural resources and the environment.■

Endnotes

1. FESS defines environmental security as a condition in which a nation or region, through sound governance, capable management, and sustainable utilization of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the welfare of its population.
2. The Kimberley Process began in May 2000 when the government of South Africa brought together industry, NGOs, and governments to discuss the problem of conflict diamonds. The outcome was the Kimberley Process Certification Scheme, which officially went into effect in January 2003. Despite shortcomings in the area of enforcement mechanisms and independent monitoring, the Kimberley Process has been credited with bringing the number of conflict diamonds in the world market down from a high of 15 percent to the current level of less than 1 percent (PAC [n.d.]).
3. During the civil war, farmers all but ceased growing cereals and rice because of their susceptibility to looting. Instead, they grew tubers, such as cassava, which require fewer inputs and are not easily looted.
4. Three-quarters of the country is under mineral exploration, which can entail everything from conducting geological studies to engaging in artisanal, small-scale, or large-scale mining.

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