



Baseline
Assessment of
Development
Minerals
in Uganda
Volume 1

March, 2018

Programme Partners:



ACP-EU Development Minerals Programme.
Implemented in Partnership with UNDP
www.developmentminerals.org



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Cover design: Ana Beatriz Dominguez Organero

Cover Photo: Aggregate miner, Masaka, Uganda.
Credit Olivia Lyster, 2017.

Acknowledgements: Special thanks to the Uganda
Ministry of Energy and Mineral Development
(MEMD), Directorate of Geological Survey and
Mines, the District Local Government Officials, and
the many ASM community members – women and
men miners, trades and small enterprise owners
– who provided significant input throughout the
field mission. The study benefited greatly from
the support of: Maximin Emagna, ACP Secretariat;
Sergio Piazzardi, European Commission,
International Cooperation and Development; Degol
Hailu, Godefroid Bigirimana, Asan Amza, Nicholas
Burunde, Wilson Kwamya and the operational and
support staff at UNDP; and finally the members of
the Uganda Country Working Group of the ACP-EU
Development Minerals Programme who provided
crucial input and suggestions: Data Gabriel (Chair),
Vincent Kedi (Programme Focal Point), Agnes Alaba
Kuterema, Catherine Nyakecho and Godfrey Bahati,
MEMD; Wilson Kwamya and Hope Kyarisiima,
UNDP; Christian Raitz von Frenzt, EU Delegation;
Catherine Wabomba, Uganda Chamber of Mines and
Petroleum; Don Bwesigye and Chris Musiime, Africa
Centre for Energy and Mineral Policy; Ruth Mbabazi,
Environmental Women in Action; Phillloh Aryatwijuka,
ECO - Uganda; Rose Gertrude Gamwera, Uganda
Local Government Association; Patience Nsereko,
National Environment Management Authority;
Patrick Etoko, Ministry of Works and Transport; and
John V. Lutaya, Ministry of Lands Housing and Urban
Development.

This study is published as part of the publication
series: Development Minerals in Africa, the
Caribbean and the Pacific

**About the ACP-EU Development Minerals
Programme:** The ACP-EU Development Minerals
Programme is an initiative of African, Caribbean
Pacific (ACP) Group of States, coordinated by
the ACP Secretariat, financed by the European
Commission and United Nations Development
Programme (UNDP) and implemented by UNDP.
This €13.1 million capacity building program aims
to build the profile and improve the management
of Development Minerals in Africa, the Caribbean
and the Pacific. The sector includes the mining
of industrial minerals, construction materials,
dimension stones and semi-precious stones.

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Executive Summary

The ACP-EU (African, Caribbean and Pacific Group of States, with support from the European Union) Development Minerals Programme, a pioneering three-year, multi-country initiative implemented by the United Nations Development Programme (UNDP), seeks to build the profile and improve the management of Development Minerals. Development Minerals are minerals and materials that are mined, processed, manufactured and used domestically in industries such as construction, manufacturing, infrastructure and agriculture. Through capacity building of a diverse range of stakeholders in government, private sector and civil society, the ACP-EU Development Minerals Programme aims to: (i) Enhance employment and incomes, including employment and incomes of women; (ii) Improve the policy and regulatory environment; (iii) Minimize environmental impacts on communities ; (iv) Address individual and community rights and preventing conflict; (v) Ensure decent working conditions and (vi) Facilitate South-South cooperation and cross-country learning.

In order to support these aims and, in particular, country-level efforts of the ACP-EU Development Minerals Programme in Uganda, Levin Sources has been contracted to undertake a comprehensive "*Baseline Assessment and Value Chain Analysis of Development Minerals in Uganda*". With a particular emphasis on artisanal and small-scale (ASM) operators and related micro- and small-enterprises (MSEs), the study aims to provide a foundation for evidence-based policy and decision-making in Uganda by profiling the economic significance, scope and potential of the sector, as well as fostering an understanding of the sector's technical, legal, social, occupational and environmental challenges and opportunities.

Approach and Methodology

The study objectives were fulfilled through collection, analysis and interpretation of primary and secondary data collected from a range of sector stakeholders across all steps of Development Minerals value chains from mine to final market. Primary data collection consisted of 42 site assessments in 22 districts, focus group discussions and interviews with 434 participants from Artisanal and Small-scale Mining (ASM) sites, 73 Points of Sale and 10 district governments as well as consultative meetings with central private and public-sector stakeholders. Existing secondary data has been used to supplement and where possible validate primary data. Whilst figures presented are not statistically significant, they allow for a representative picture of the largely undocumented Development Minerals sector.

Whilst there are many different kinds of Development Minerals, eight were chosen as focus minerals for the Baseline Study, and four of these eight were selected in consultation with the Country Working Group for more comprehensive market study and value chain analysis. The focus minerals in the baseline include: clay, stone aggregate, dimension stones, sand, limestone, salt, kaolin and gypsum, the first four of which were chosen for the value chain analysis undertaken in a second phase of work. Results of the latter are presented in Volume 2 of this report "*Market Study and Value Chain Analysis of Selected Development Minerals in Uganda*."

Development Minerals Context

A land-locked country located in East Africa, the Republic of Uganda was one of the 15 fastest growing economies in the world from 1987-2010 with GDP growth averaging at 7% per year, declining significantly to 3.9% in Fiscal Year (FY) 2016/17. Although Uganda has made significant progress towards the millennium development goals, including by achieving the target of halving the number of people living in extreme poverty before 2015, many development challenges remain, including high school-dropout rates, high unemployment and 25% of Ugandans still living in extreme poverty.

Against this backdrop, the Government of Uganda (GoU) has prioritized job creation and massive infrastructure improvements among the critical development priorities outlined within its Uganda Vision 2040. In a drive to stimulate economic growth, reduce business costs and support progress towards industrialization, the GoU aims to rehabilitate and construct 30,000km² of roads, key bridges, and to build 1.6 million housing units by 2020. The GoU additionally recognizes that micro, small and medium enterprises (MSMEs) constitute 90% of Uganda's private sector and contribute 20% of the GDP. Through its current National Development Plan, the GoU has elaborated a multi-faceted MSME Policy that seeks to address current legal, institutional and other challenges facing this important group of economic actors.

The GoU's objectives concerning infrastructure development, employment generation and economic transformation are explicitly linked with the Development Minerals sector. The Ugandan construction sector, which is experiencing annual growth of 6%, demands multiple "building minerals" including sand, clay, limestone, marble, kaolin and sources of stone aggregate. What is more, the sector is also a huge contributor to employment, with artisanal and small-scale mining (ASM) alone having an estimated 390,000 strong workforce country-wide. ASM is, however, largely informal throughout the country and its development contributions, risks and opportunities have been, to a great extent, invisible. It is in this context of increasing understanding of the importance of the sector balanced with an acute lack of data on Development Minerals, and ASM in particular, that the Baseline Assessment and Value Chain Analysis was commissioned.

Key Findings: Profile of the Development Minerals Sector

Development Minerals are poised to substantially contribute to these Uganda's development goals. Key findings from the sector profile allude to both the tremendous economic potential of Development Minerals and main challenges that must be overcome in order to fully realize this potential.

Uganda boasts a diversity of Development Minerals. These include a broad range of construction minerals including clay, sand, limestone, marble, kaolin and sources of stone aggregate and dimension stone that are essential to meeting demands of both the rapidly growing population and public infrastructure investments. Among a range of industrial minerals, sectors such as plastics production, pharmaceuticals and oil well drilling all rely on mineral inputs including salt, kaolin and bentonite, respectively. Development Minerals also include agro-mineral inputs such as phosphates, vermiculite and lime, which have significant potential to spur agricultural production, counter depleting soil fertility and maintain food security.

Despite multiple potential downstream applications, most Development Minerals are transformed into a limited number of products and/or produced in insufficient quantities, with implications for the trade deficit. Reliance on imports of many Development Minerals and their products constituted 3.2% of Uganda's trade deficit of -2.56 billion USD in 2016. The most significant contributors to this are ceramics (inclusive of sanitary ware, dishware and other products that can be derived from kaolin), cement, salt (mainly in the form of iodized table salt) and to some extent lime.

ASM is responsible for production of an estimated 83% of all Development Minerals (by value) in the country. Estimated at 350 million USD in 2015, ASM production equates to 5.3 times the value of estimated medium and large-scale production for these minerals and 7.5 times that of their officially reported production. This is also 4.2 times the value of estimated (unofficial) artisanal gold production and over 7 times the value of *officially reported production of all mineral commodities*, including limestone, pozzolana, kaolin, vermiculite, aggregate, gold, tungsten, tantalum, tin and cobalt. Main ASM products by volume, value and employment are solid, burnt clay bricks followed by stone aggregate and limestone.

ASM Development Minerals are a major source of rural and peri-urban employment. Production of clay bricks, sand, stone aggregate, dimension stone, kaolin, salt and pozzolana is estimated to directly employ approximately 390,000 Ugandans, with women constituting 44% of the workforce. This marks a 116% increase since 2008 estimates. Clay, sand and stone aggregate, in particular, are mainly located in close proximity to urban centers and, in light of soaring urbanization rates, are expected to constitute a growing source of much needed employment. Within 150km of Kampala alone, 1238 active and abandoned sites for clay (576), sand (346) and stone aggregate (316) production have been identified.

Despite the high value of ASM production, the majority of the ASM workforce do not earn significant income from ASM. Individual incomes average ca. \$300 per annum or less than half of the gross national income (GNI) per person. This is largely attributed to three factors: (i) sharp declines in production and employment in the rainy season; (ii) production inefficiencies resulting in low quality, low priced products; and (iii) the way in which most ASM is organized and financed, resulting in almost half of production value (estimated at 48% on average) accruing to site owners, pit owners, supervisors, land owners and other economic actors. Among mineworkers, women earn on average approximately 33% less than men, mainly due to the gender division of labour at ASM sites. Two main factors provide deeper insight into these outcomes. First, research indicates that the GNI is skewed given growth in the middle and upper class and incomes of the majority of the working population are actually much lower than the GNI per capita. Second, given that an estimated 77% of Development Minerals miners receive supplementary income from alternative livelihood options, actual income per capita may be as high as \$418p/a and 385p/a for women and men miners who also rely on agriculture, respectively.

Strengthening human capital and ensuring inclusive development are key to unlocking the employment and wealth creation potential of the sector. Although a number of structural inefficiencies (e.g. high energy costs, access to new markets, poor production methods) impact all economic actors in the sector, a fundamental understanding is needed of the private sector actors responsible for the bulk of Development Minerals production, the ASM workforce. In this respect:

- Although young, single and largely disenfranchised men constitute a major proportion of the ASM workforce, particularly in clay and sand mines, the majority of the workforce is, on average, married, between the ages of 18-30 years and originate within the area or districts where activities take place.
- If clay brick production is excluded, women's employment share skyrockets to 69%, mainly due to their high participation rates in stone quarries, particularly in northern Uganda. Ensuring that women are not left behind through strategies to transform the sector will be crucial to advancing inclusive development and broad-based wealth creation from Development Minerals.
- Young children can be found around mines, mainly due to lack of childcare, as most miners seem to invest earnings sending their kids to school. Nevertheless, across Uganda, 2014 statistics indicate that whilst primary school enrolment stood at 8.7 million, secondary school enrolment stood at only 16% of that (1.4 million) in the same year. High rates of school dropout are a systemic crises in the country. Not surprisingly, child labour rates in mines, particularly for those over the age of 14 years, is a major concern from both a human rights perspective and in terms of the nation's development.
- Roughly 70% of ASM miners also rely on other livelihoods, including in agriculture and trade. This diversification enables investment of ASM revenues in, and therefore buttresses, other sectors while providing a means to supplement low incomes from ASM.
- With relatively low barriers to entry into the ASM sector (requiring limited skills and financing), the sector continues to mainly operate at an artisanal level, employing basic and often environmentally damaging and occupationally risky technologies and methods. This both perpetuates the low incomes derived from work in the sector and impedes the capacity of miners to invest in improvements.

It is estimated that 98% of ASM production and 56% of MSM and LSM production of Development Minerals takes place outside of the current mining sector legal framework.

For Uganda to fully capitalize on the tremendous economic potential of Development Minerals, policy, legal and institutional actions must be taken in order to bring this neglected sector from obscurity into the mainstream economy. This transformation hinges on formalization of ASM. Although tax collection appears to be foremost in the minds of many regulators, the sector's greatest development potential lies in the substantial direct and spin-off benefits of the sector vis-a-vis stimulation of local economic development and related employment benefits. Formalization provides the vehicle through which ASM can be organized and services and support can be extended as needed to improve performance, increase productivity and incomes and tackle critical issues therein. Findings from analysis of the policy, legal and institutional framework lend insight.

Key Findings: Policy, Legal and Institutional Framework

The current Mining Policy (2001), Act (2003) and Regulations (2004) explicitly recognizes ASM for its contribution to the economy, livelihood significance and the unique environmental, occupational and social challenges posed by the sub-sector. In accordance with this, the

Government of Uganda (GoU) explicitly commits to: “Regularize and improve artisanal and small scale mining through light-handed application of regulations, provision of information on production and marketing, provision of extension services through miners associations and implementation of awareness campaigns targeting artisanal and small scale miners” (Minerals Policy, 2001). Since promulgation of this legislation, minerals sector stakeholders have had an opportunity to evaluate the strengths and weaknesses of the prevailing framework, including as new challenges and opportunities have emerged with the sector’s evolution.

The GoU has taken steps to address fundamental gaps with respect to Development Minerals.

Under the 1995 Constitution of Uganda, building minerals such as “clay, murrum, sand and any stone commonly used for building or similar purposes” were not defined as minerals and therefore constitutionally excluded from the jurisdiction of mining authorities. The GoU has recognized these shortcomings and taken steps to rectify this situation, including through constitutional amendments in 2006 that sought to distinguish extraction to meet personal needs from commercial extraction and beneficiation of these Development Minerals.

Analysis of the prevailing policy and legislation lends insight into additional opportunities and constraints for the Development Minerals sector. Specific issues relate to the following¹:

- *Ugandan legislation does not distinguish between ‘artisanal’ and ‘small-scale’ mining.* Different classifications by scale would: (i) provide a basis for entry for artisanal producers into the formal sector; (ii) recognize the diversity of work and organizational arrangements that already exist (e.g. small enterprises, community-based organizations, small companies); and (iii) and provide an opportunity for operators to “step up” to the next category as their operations improve and financial and technical capacity is built.
- *Investment Constraints:* Licences designated for ASM (Location Licences) are constrained to operations that do not expend over roughly \$3000 on activities. This criteria is easily exceeded by purchase of a decent sized water pump, stone cutting machine or small jaw crusher. This provision can constrain those operations that seek to improve productivity and efficiency and invest in value addition or more environmentally and occupationally responsible practices.
- *Applicable minerals.* Regulation 28(1) of the Mining Regulations (2004) provides for granting of a location licence² for *only* precious metals, gemstones, limestone, chalk, salt and brine. Despite this, DGSM has in some cases granted licences for other Development Minerals (e.g. pozzolanic ash, kaolin, dimension stones). This definition nevertheless excludes the most significant commodities in the sector in terms of employment, economic contributions and associated environmental and occupational risks.
- *Permissible licence area and duration of licence.* The maximum permissible location licence area varies depending on commodity within seven (7) categories under the licence. Based on average areas impacted for different commodities and duration of ASM activities (often in excess of 20 years), current criteria are inappropriate, in

¹ Similar conclusions have been drawn by MEMD, 2009; Hinton, 2012, and Barreto et al, 2017.

² Under the Mining Act and Regulations, a “location licence” is granted for small-scale prospecting and mining operations which do not involve expenditure in excess of five hundred currency points (UGX 10,000,000/=) or the use of specialized technology. Because of the low investment, most small-scale mining operations are best suited for location licenses.

particular for ASM production of salt, clay, sand, kaolin and limestone. This is a barrier to longer-term planning and investment by current operators.

- *Bureacracy and cost.* Current requirements are too complex and costly given the socio-economic status and technical capacities of most of the ASM workforce. Furthermore, the process is centralized in Entebbe, providing an additional impediment to many licence seekers. Given gender disparities in language, literacy and socio-economic status, women may experience greater challenges than men in this process, a situation likely to be compounded by their heavy domestic work burdens and, in some cases, lack of autonomy. This is exacerbated by the impracticable requirement for ASM miners to obtain a prospecting licence prior to applying for a Location Licence.

Additional concerns relate to the current institutional set-up governing the sector.

- *Governing authorities have a clear policy mandate but a weak legal mandate with respect to ASM.* The Mining Policy (2001) commits the GoU to providing extension services and other forms of support to ASM stakeholders, including through organization, training and enabling market access, among others. However, the Mining Act (2003) and Regulations (2004) detail only licencing and enforcement functions, providing little direction as to how and by whom extension service commitments shall be fulfilled.
- *This has increased the likelihood that related workplans, activities and budgets dedicated to ASM Development Minerals (and other actors in ASM) will largely go under-funded and unfulfilled.* This risk is heightened by the lack of a unit, office or department dedicated to ASM (as found in most other ASM jurisdictions).
- *Roles and responsibilities for the governance of the Development Minerals ASM sector beyond the Directorate of the Geological Survey and Mines (DGSM) are even more unclear.* Although they sometimes play a key in taxation and “policing”, the management of the Development Minerals sector is not embedded into local government budgets or District Development plans. Local governments have expressed confusion as to their specific objectives and roles in the sector despite officers from many line ministries being reasonably well positioned (although lacking sectoral capacity) to play supporting roles related to organization, commercialization, health and safety and others. Many call for increased coordination with DGSM.
- *Risks of an imbalanced emphasis on taxation and policing are extremely high and likely to increase as awareness of ASM Development Minerals is built.* Sustained progress towards realization of Development Minerals’ full potential is unlikely to be achieved unless government genuinely commits to playing *both* supportive and regulatory roles in the sector. As demonstrated in a multitude of ASM jurisdictions over the past 3 decades, “carrot-and-stick” approaches to policy and legislation are unlikely to work if only “sticks” are on offer. If no clear benefits are yielded from legality, i.e. in terms of sustained access to information, training, equipment or financing, then widespread formalization of ASM Development Minerals – and the development potential hosted therein - are likely to remain elusive.

Recognizing the changing context and need for updating of the current policy and legal framework, the Government of Uganda (GoU) has embarked on the process of reforms. This has, thus far, culminated in a draft National Mining and Minerals Policy of Uganda (NMMPU), now in its final phases of review. Following requisite approvals of the NMMPU, DGSM officials indicate

that efforts are underway to expedite promulgation of a new body of minerals sector law and regulations.

This provides an unparalleled opportunity to support inclusive development and wealth creation from the Development Minerals sector. The draft NMMPU has discernibly shifted in its recognition of both Development Minerals and ASM and is poised to address current gaps and provide the ongoing support needed for sector development. The current Policy (and the legislation which follows) could nevertheless be strengthened by: clarifying institutional mandates and coordination arrangements; by emphasizing value chains in addition to supply chains; by recognizing risks associated with potentially marginalizing terms, such as “bona fide”; by clarifying in which case designation of ASM areas apply and, importantly, by affirming commitments to ASM extension services and ensuring accountability in workplans, budgets and monitoring and evaluation frameworks.

Key Findings: Institutional and Technical Operating Context

Critical opportunities and barriers in the institutional and technical operating context must be addressed to support improved performance in the Development Minerals sector. These largely pertain to access to geodata, sector promotion, financing and other support services. While a multitude of initiatives, projects, programs and other opportunities exist that could aid in the advancement of ASM Development Minerals, access and accessibility pose major challenges, particularly for women and the most vulnerable members of the ASM sector.

An abundance of geodata exists but it is out of reach of most engaged in the sector. The Directorate of the Geological Survey and Mines (DGSM) in particular houses a phenomenal data set. Potential uses include, but are not limited to, identification of mineral occurrences and deposits and characterization of deposits according to potential volume and value, determining feasibility for extraction and processing, identification of different hazards and risks and assessing suitability for different mineral deposits for different products and uses. These knowledge products are largely out of reach for most Development Minerals sector stakeholders in terms of both distance (most data is centralized in Entebbe) and financial and technical capacity to fully utilize them.

Countless sector promotion opportunities exist but most are unaware of or do not prioritize Development Minerals. These include a range of trade fairs, networking opportunities, business opportunities and training and related SME support services. Classification of Development Minerals as “low value” and lack of awareness by both economic actors in Development Minerals value chains and those leading those programs, initiatives and organizations are key factors. These can be overcome by a better understanding of the significance of the sector and sector promotion activities tailored to Development Minerals stakeholders.

Uganda has a thriving microfinance industry and larger banks show interest in the sector but most ASM miners do not have the qualifications to be eligible for formal financial services. Main issues relate to lack of ownership of land or other collateral, lack for formal production records and, in many cases, holding of bank accounts. This is compounded by exceptionally high interest rates, and suspicion and reluctance of ASM miners to engage with formal banking systems. Importantly, an overemphasis by the mining sector on quantifying reserves rather than utilizing production and sales records and/or banking history creates an unrealistic impediment for ASM operators, particularly given the nature of most Development Minerals deposits and duration of mining.

A range of support services, from private sector associations to workers rights advocacy groups and NGOs are positioned to support economic actors involved in ASM Development Minerals. Despite this, most active associations exist to support larger private sector actors (e.g. the Uganda Chamber of Miners and Petroleum) or are focused on higher profile commodities (e.g. ASM gold). Labour organizations work largely outside of the minerals sector and, particularly in the case of ASM, very few workers are on contract or formally working, thus application of labour legislation and related workers rights frameworks has been extremely limited.

Research and Development activities provide an important opportunity to deepen understanding and identify technical solutions to many of the sectors challenges. Considerable research has been conducted on specific regions (e.g. Karamoja), topics or commodities (e.g. environmental impacts of clay brick production, mineralogy of clays) but major gaps exist. Whilst a number of sector-wide reviews provide insight into the distribution and nature of known deposits, research is needed, in particular, concerning technical measures (i.e. ASM appropriate technologies) to improve production efficiency and add value to ASM products.

Key Findings: Analysis of Environmental, Occupational and Social Impacts

Among a number of environmental impacts, main concerns relate to land degradation, consumption of forest resources from clay brick and lime production and degradation of wetlands from sand and clay mining. ASM Development Minerals extracted in Uganda are estimated to directly impact approximately 515 km², or approximately 0.3% of the country's total land area, far below that affected by agriculture (41%). Wetland degradation from clay and sand mining is extensive, covering an estimated 221 km². Clay brick production alone is estimated to consume 2.9 million tonnes of wood per annum, impacting an estimated 457 km² of forests annually. Although positive examples of management strategies exist in specific ASM sites (e.g. backfilling of abandoned pits, tree planting), these are few and far between.

Occupational health and safety risks are severe. Rocks falls and pit wall collapses are the main sources of serious injury and fatality with 34% of quarry sites assessed reporting at least one fatality. This suggests that fatalities could be as high as 1.1 deaths per 1,000 stone quarry workers per annum. Other serious risks are posed by dust exposure, heat stress and overexertion, flying rock fragments, alcohol abuse at some sites and poor sanitation and hygiene, among others. This situation compounded by average workdays amounting to 9-10 hours per day and lack of on-site first aid, personal protective equipment (PPE) and other much-needed management measures.

Social impacts can be both positive and negative. Main issues include conflicts between miners, between miners and traders often related to non- or under-payment and between miners and other land users. Child labour and the presence of children at mines are serious concerns although many miners cite work in ASM as providing them with the means to send their kids to school. The inequitable distribution of revenues, crude methods and inadequate knowledge and technical capacity to improve performance have resulted in very low individual incomes of mineworkers, when averaged across dry and rainy seasons, although about 70% invest in and supplement this through work in other sectors. Gender inequalities are particularly pronounced, particularly with respect to the distribution of benefits (e.g. jobs, revenues) and impacts (e.g. impact of siltation on downstream water users). Other human rights issues relate to potentially

increased risks of exploitation and other abuses by some authorities against unlicensed miners. The latter may become a bigger issue as public awareness of ASM Development Minerals grows and related human rights risk mitigation strategies should be adopted by the Government and ACP-EU Development Minerals Programme in Uganda.

Socio-economic contributions are nevertheless significant. ASM provides a crucial source of livelihoods for over 390,000 Ugandans, particularly for disenfranchised, low-skilled workers with limited alternatives. The majority of miners are also engaged and invest in other economic activities, thereby supporting economic diversification. Main economic contributions include the following:

- **GDP.** If ASM Development Minerals, which amount to an estimated \$350 million USD per annum, were integrated within official statistics, the GDP would increase by 1.4%.
- **VAT.** Based on average household consumption patterns in Uganda, miners contribute and estimated \$9.9 million USD per annum to VAT (equating to almost 2% of VAT collected in 2016).
- **Local Economic Development.** Miners incomes are estimated to annually contribute almost \$124 million USD spent into local economies, towards education, health care and other family needs and as investment in diversifying economic activities, for instance in agricultural and trade. This is a vital catalyst for local economic development.
- **Multiplier Effects.** The average ASM miner is estimated to create 0.4 jobs in the downstream sector, and considering an average household size of 4.7, ASM Development Minerals directly and indirectly benefits almost 2.5 million Ugandans or about 7% of the population.

Conclusions

This study has shown that the Development Minerals sector plays a significant role in Uganda. As the majority of Development Minerals are produced by ASM, the sector generates income for a large workforce and contributes substantially to both local and national economic development. The high participation of women in the workforce, particularly for some commodities such as stone aggregate and salt, highlights the importance of the sector in reducing gender imbalances in paid employment across the country, the significance of women's contributions to development and the need for targeted measures to rectify inequalities in the sector.

However, the sector is not without its challenges. It poses significant environmental, social and occupational risks, which must be managed better if negative impacts are to be reduced over time. The sector is also severely under-documented, which presents barriers to better management and oversight by the institutions that govern it as well as to the development of more appropriately-tailored services by training providers, financial institutions and other relevant service providers. A better understanding of the sector and its workforce is crucial if it is to grow sustainably and in a way that generates long-term and sustainable social and economic benefits for the country.

Despite these challenges, there is significant potential for advancement of the sector. GoU has made infrastructure one of its top priorities. This, combined with the growth in residential and commercial construction driven by Uganda's burgeoning population, offers significant scope for the Development Minerals sector to generate sustained income and employment opportunities, especially for the thousands of young people entering the Ugandan workforce each year. Furthermore, there is strong potential for the sector to reduce Uganda's trade deficit by producing materials locally that are currently being imported to meet growing domestic demand.

Finally, the ongoing policy and legal reform process provides a major opportunity to fill key gaps in the existing policy and regulatory framework and deliver the substantial opportunities that the sector holds. Indeed, the outcomes of these reforms shall ultimately determine whether Development Minerals achieve their full potential as an engine for inclusive and gender-responsive development, wealth creation and Uganda's aim to become an upper middle-income country by 2032.

Recommendations³

The ongoing policy, legal and institutional reform process has a critical role to play in transforming the sector to realise its full potential for economic and social development in Uganda. Main entry points relate to:

- The establishment of a dedicated ASM unit or department in DGSM and formalization of mandates of multiple key agencies, including local government.
- Involvement of Development Minerals stakeholders in the current policy and legal reform process.
- The establishment of a forum for better communication and coordination between government bodies, and the development of effective mechanisms and strategies for the sector.
- Piloting of different devolved governance arrangements for the ASM Development Minerals sector.

Emphasize human capacity development and empowerment of gender-responsive ASM organizations as the foundation for transforming the sector. Current training approaches used by the ACP-EU Development Minerals Programme provide an excellent model for similar programs that could be implemented in the long-term by government and other actors (e.g. civil society organizations, donors, etc). Key elements and entry points include:

- Continuing to engage with relevant government officials in design and delivery of training;
- Supplementing classroom-based training with practical, hands-on training at site level;
- Piloting the provision of scholarships in key topics for short-term practical training.

³ Please see "*Conclusions and Recommendations*" for a more in depth presentation of this report's recommendations.

- Tailoring of training curricula and materials to commodity-specific needs.
- Organizational formation and strengthening, including by training in democratic processes and increasing responsiveness to gender and human-rights concerns.

Establishment of a range of pilot project such as “model mines” and “model value chains” could provide a platform for inclusive, practical experimentation and sustained progress. Well planned and executed pilot activities have the potential to generate the concrete evidence needed to demonstrate the sector’s full potential while building requisite capacity and strengthening links between stakeholders. Options to consider include:

- Piloting procurement models in 1-2 districts for sourcing from ASM suppliers for civil works projects.
- Piloting a Vocational Training Certificate in ASM Development Minerals.
- Piloting collaborations between large- and small-scale operators.
- Co-developing and piloting different alternative financing models with financial service providers.
- Piloting intermediate, appropriate technologies, ideally in conjunction with financing efforts.
- Supporting the launch of a National Development Minerals Conference and/or “sharefair”.

Acronyms and Abbreviations

ACP	African, Caribbean and Pacific Group of States
ASM	Artisanal and small-scale mining
BPAF	Bank Payment Advice Forms
CAO	Chief Administrative Officer
CCOs	Certificate of Customary Ownership
CDO	Community Development Officer
COBE	Census of Business Establishment
CWG	Country Working Group
DDP	District Development Plan
DEA	Directorate of Environmental Affairs
DEO	District Environment Officer
DGSM	Directorate of the Geological Survey and Mines
DGMS	Directorate General of Mines Safety
DLO	District Labour Officer
DNPM	National Department of Mineral Production
DPO	District Planning Officer
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EIA	Environmental Impact Assessments
EA	Environmental Audits
EU	European Union
FGD	Focus Group Discussion
FGCM	Feedback Grievance and Communication Mechanism
GDP	Gross Domestic Product
GIS	Geographic Information System
GoU	Government of Uganda
HAVS	Hand Arm Vibration Syndrome
IA	Impact Assessment
IBM	Indian Bureau of Mines
IGF	Intergovernmental Forum of Mining and Metals
IM Act '52	Indian Mines Act 1952
KG	Kilogrammes
LSM	Large-scale mining
MCR '60	Mineral Concession Rules, 1960
MCDR	Mineral Conservation and Development Rules
MEMD	Ministry of Energy and Mineral Development

MFI	Microfinance Lending Institutions
MGLSD	Ministry of Gender, Labour and Social Development
MoH	Ministry of Health
MLHUD	Ministry of Lands, Housing and Urban Development
MMRD Act '57	Mines and Minerals Regulation and Development Act 1957
MoFPED	Ministry of Finance, Planning and Economic Development
MoFA	Ministry of Foreign Affairs
MoIA	Ministry of Internal Affairs
MoLG	Ministry of Local Government
MME	Ministry of Mines and Energy
MPF	Mining Policy Framework
MRB	Mineral Rights Board
MSEs	Micro- and small- enterprises
MSM	Medium-scale mining
MWE	Ministry of Water and the Environment
MT	Metric Tonnes
NEMA	National Environmental Management Authority
NFA	National Forest Authority
NMMPU	National Mining and Minerals Policy
NRO	Natural Resources Officer
PAC	Partnership Africa Canada
PMF	Progressive Massive Fibrosis
PPE	Personal Protective Equipment
POS	Points of Sale
RIA	Regulatory Impact Assessments
Rural SPEED	Rural Savings Promotion and Enhancement of Enterprise Development
SACCOs	Savings and Credit Cooperative Organization
SASMA	Singo Artisanal and Small-scale Miners Association
SDGs	Sustainable Development Goals
SGBV	Sex and Gender-Based Violence
SIA	Strategic Impact Assessments
SIHRA	Social Impact and Human Rights Assessments
SME	Small and medium sized enterprises
SMED	Small and Medium Enterprise Division (of the Uganda Investment Authority)
SMMRP	Sustainable Management of Mineral Resources Project
STD	Sexually Transmitted Diseases
TB	Tuberculosis
TIN	Tax Identification Number

UGX	Ugandan Shillings
UIA	Uganda Investment Authority
UBOS	Ugandan Bureau of Statistics
UNDP	United Nations Development Programme
UNMA	Uganda National Meteorological Authority
UPDF	Ugandan People's Defence Force
UPF	Ugandan Police Force
URSB	Uganda Registration Services Bureau
UWA	Uganda Wildlife Authority
VSLA	Village Savings and Loan Association
WAEMU	West African Economic and Monetary Union
WBV	Whole Body Vibration
WFCL	Worst Forms of Child Labour

Introduction

The ACP-EU Development Minerals Programme, a pioneering three-year, multi-country initiative implemented by the UNDP, seeks to build the profile and improve the management of Development Minerals. Development Minerals are minerals and materials that are mined, processed, manufactured and used domestically in industries such as construction, manufacturing, infrastructure and agriculture.⁴ Development Minerals include industrial minerals, construction materials, dimension stones and semi-precious stones.⁵

With support from the European Union (EU) and United Nations Development Programme (UNDP), this African, Caribbean and Pacific (ACP) Group of States initiative is operating at both regional levels, where capacity is being built in 40 ACP countries, and national levels, through more extensive support provided to six focus countries: Cameroon (Central Africa); Guinea-Conakry (West Africa); Uganda (East Africa); Zambia (Southern Africa); Jamaica (Caribbean); and Fiji (Pacific).

Through capacity building of a diverse range of stakeholders in government, private sector and civil society, the ACP-EU Development Minerals Programme aims to: (i) Enhance employment and incomes, including employment and incomes of women; (ii) Improve the policy and regulatory environment; (iii) Minimize environmental impacts on communities ; (iv) Address individual and community rights and preventing conflict; (v) Ensure decent working conditions and (vi) Facilitate South-South cooperation and cross-country learning.

In order to support these aims and, in particular, country-level efforts in Uganda, Levin Sources was contracted to undertake a comprehensive “*Baseline Assessment and Value Chain Analysis of Development Minerals in Uganda*”.

⁴ Franks, DM, Pakoun, L and C Ngonze. 2016. Development Minerals: Transforming a neglected sector in Africa, the Caribbean and the Pacific. United Nations Development Programme.

⁵ Industrial minerals: substance of economic value, exclusive of metal ores, mineral fuels, and gemstones (e.g. barite, bentonite, borates, calcium carbonate, clays, diatomite, feldspar, granite, gypsum, industrial sand, kaolin, silica, soda ash, talc, wollastonite and zeolite).

Construction material (a sub-category of industrial minerals sometimes called ‘industrial rocks’): substances used in the construction of infrastructure, housing and other built structures (e.g. gravel, limestone (cement), construction sand, aggregate, scoria, glass, ceramics, bricks).

Dimension stones (a sub-category of industrial minerals and construction materials): rock quarried for the purpose of obtaining blocks or slabs that meet specifications as to size (width, length, and thickness) and shape (e.g. granite, marble, slate, sandstone).

Semi-precious stones: a mineral crystal or rock that is generally cut and polished to make jewelry, but that does not include diamond, ruby, emerald and sapphire (precious stones). Examples of semi-precious stones include quartz, amethyst, garnet, aqua-marine, opal and pearl.

Source: UNDP (2016), *Terms of Reference: Baseline Assessment and Value Chain Analysis of Development Minerals in Uganda*.

Baseline Assessment Objectives

With a particular focus on artisanal and small scale (ASM) operators (Box 1) and related micro- and small- enterprises (MSEs) from production through the value chain, the "*Baseline Assessment and Value Chain Analysis of Development Minerals in Uganda*" aims to:

- Increase the profile of the economic significance, scope and potential of Development Minerals and their value chains;
- Foster understanding of the technical, legal, social, occupational and environmental challenges and opportunities presented by the sector;
- Provide a foundation for evidence-based decision- and policy-making; and
- Put forward concrete, practical context- and commodity-specific and gender-responsive recommendations to the Government of Uganda (GoU), other Ugandan sector stakeholders and the ACP-EU Development Minerals Programme as needed to inform policy, law, intervention and practice.

The Baseline Assessment Report and its companion report "*Market Study and Value Chain Analysis of Selected Development Minerals in Uganda*", found in Volume 2, jointly seek to achieve these aims.

Report Overview

The Volume 1: Baseline Assessment is comprised of four (4) main components⁶:

Component 1: Profile of the Sector. Profile of the range of commodities mined, sites of extraction and beneficiation, and the businesses and employees involved in the development minerals sector.

Component 2: Review of Legal and Policy Framework. Review of relevant laws, regulations, plans and policies (including the draft Minerals Policy) with a focus on development minerals-specific gaps, inclusive of any gender related barriers that may affect inclusive development of the sector.

Component 3: Assessment of Institutional and Technical Operating Context. Analysis of the current institutional and operating environment at the national and the operational level

Component 4: Environmental, health and safety, and socio-economic impact analyses. The impact analysis includes use of mixed qualitative and quantitative approaches, where relevant.

⁶ Ibid. Extracted from the Terms of Reference, p. 33 and 34.

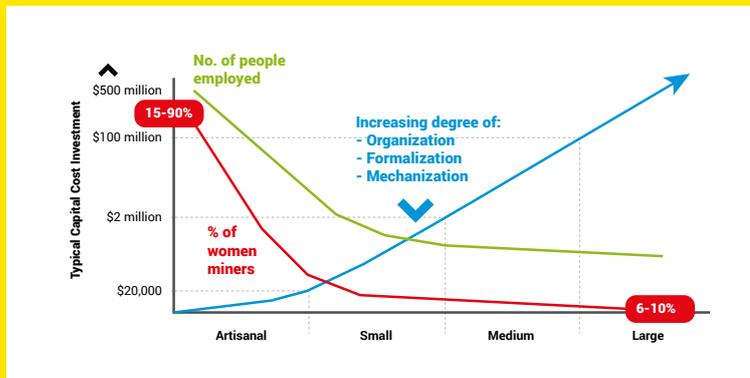
BOX 1: DEFINITIONS OF MINING BY SCALE

Definitions for artisanal and small-scale mining (ASM), medium scale (MSM) and large scale (LSM) mining differ widely by context, commodity and country, with no universally accepted distinctions between them. Although useful, these traditional labels can also be deceptive. For example, in terms of employment and overall production, the ASM sector in most countries would certainly be classified as 'large-scale'.

Some distinguishing characteristics of the various scales of mining are outlined below. Boundaries between these categories are relatively blurred but the general "trend" in terms of differences provides some insight (Fig. 1). In general:

Figure 1: General Differences between Scales of Mining

(Source: Hinton, J. 2017, Hinton, 2012)



Formality and Legal Status: The vast majority of artisanal mine sites operate outside of any legal framework. MSM operations are often partially or fully formalized, with some exceptions, whilst LSM are always formal and licensed.

Mechanization: ASM sites use rudimentary tools such as shovels

or hammers. As the scale of the operation increases through MSM, mechanization increases with the use of diggers, crushers and others, with LSM often using the most sophisticated technologies

Technical, environmental and occupational standards of practice: ASM sites generally do not abide by any formal technical, environmental or OSH standards. MSM through to LSM operate under increasingly structured standards driven by regulatory and consumer requirements.

Exploration Methods: Only very informal prospecting is conducted at most ASM sites, based on prior experience of miners, whereas MSM and LSM often use sophisticated exploration techniques to generate high-quality data.

Capital cost investment. An individual artisanal miner may own a shovel or may, in lieu of a hammer, use a rock to break other rocks. In comparison, capital investment for a large-scale operation can readily exceed \$100 million USD.

Workforce Size and Incomes per capita: Whilst ASM workforce size for individual sites varies hugely, ranging from 2 people to over 1000, the workforce in the sector as a whole is in general much larger than the MSM or LSM sector, where increased mechanization means that fewer jobs are conducted by the manual workforce. In contrast, incomes per capita are far lower in the ASM sector than in MSM and LSM.

Seasonality: Due to lack of site management, mechanization and low levels of financial security, ASM sites are particularly vulnerable to seasonal aspects such as difficult weather and subsequent market fluctuations. MSM and, to a greater extent, LSM, are able to better plan for and manage seasonality.

Vulnerability to External Shocks: Low incomes per capita and a lack of tangible assets mean that ASMs are vulnerable to external shocks such as fluctuations in price and demand. MSMs and LSMs are more able to plan for and manage similar external shocks.

Approach & Methodology

Scope of Work

The aim of this study was to provide a comprehensive baseline assessment of Development Minerals in Uganda that highlights current dynamics and key issues relevant to improving the sector. This aim was fulfilled by way of an iterative process in consultation with sector stakeholders, and involved the collection of both primary and secondary data. Primary data collection consisted of site assessments, focus group discussions and interviews at Artisanal and Small-scale Mining (ASM) sites and Points of Sale (PoS) of Development Minerals as well as consultative meetings with central stakeholders and local government representatives. Existing secondary data was used to supplement the primary data collected during the field phase of the project.

Commodity and Regional Coverage

As agreed with UNDP and the Country Working Group (CWG) during the Inception Phase, field activities were implemented to collect data and information on the following minerals:

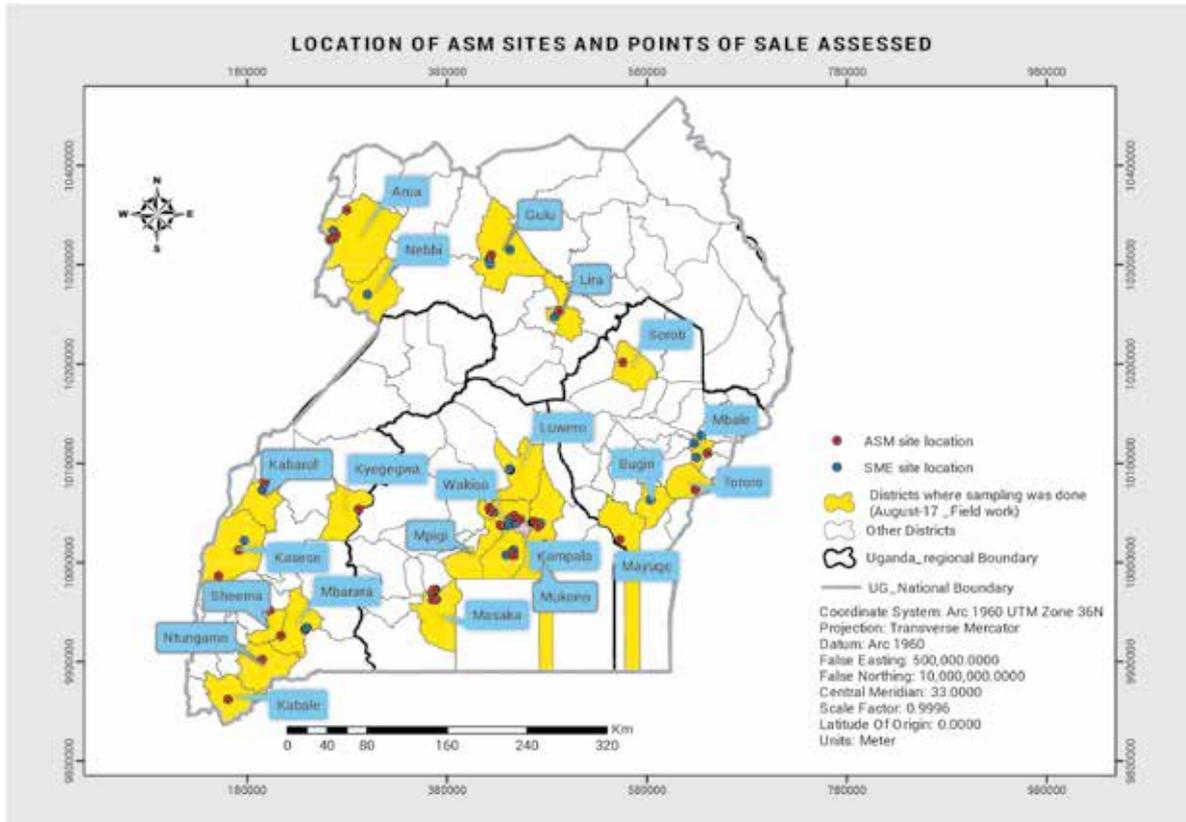
Table 1: Selected Minerals for the Baseline Study and Value Chain Analysis

MINERALS	
Clay	Value Chain Analysis
Stone aggregate	
Dimension stones	
Sand	
Limestone	Baseline Study
Salt	
Kaolin	
Gypsum	

The commodities for the baseline and value chain analysis were selected by way of a participatory exercise with the Country Working Group prior to the commencement of the fieldwork phase. The Country Working Group prioritised a number of selection criteria in order of importance to the programme, by anonymous vote. These included current economic impact, downstream potential, geographical distribution, commodity distribution and anticipated effort required for impactful interventions. Current economic impact and downstream potential were identified as the main priorities of the Country Working Group, and, based on the Ugandan context and the expertise of the research team, the minerals presented in Table 1 were selected as focus minerals for the study.

Field research was carried out in each region of Uganda (Table 2, Figure 2). This included a total of 22 districts in: Central (7 districts); Western (3 districts); Southwest (3 districts), Eastern (5 districts) and Northern Uganda (4 districts including 2 districts in West Nile Sub-region).

Figure 2: Districts and sites where field research was conducted



Research Approach

The general research approach involved the following:

The use of mixed methods of data collection to increase reliability and robustness of data

- A total of 8 tools were developed for the collection of primary data from the field. They targeted a variety of stakeholders, including Development Minerals ASM mine site workers, site owners and managers, traders, cooperative leaders, local government representatives, and others. These tools included both structured and semi-structured interview guides, each developed according to the variety of contexts that would be encountered during fieldwork. These included, for example, a semi-structured survey for interviews with Central and Local government, semi-structured surveys for ASM sites, differentiated by mineral category, and structured survey tools for points of sale. All tools were field tested and refined prior to the commencement of the field research.

Integration of the data collection for baseline and value chain analysis

- This integration was based on the awareness that some individuals and offices were positioned to provide information on multiple components which spanned both the baseline and value chain analysis aspects of this project. The tools were designed with this in mind, and aimed to reduce redundancy likely to result from collecting different data from the same individuals at different times. The approach used allowed for the sampling of a greater number of individuals to give data for each component, aiding triangulation.

Research ethics

- All data collection was conducted in strict adherence to Levin Sources' policy on research ethics, which provides guidance to all field researchers with regards to best-practice approaches to both desk and field research. The policy outlines the need for professionalism and accuracy of research and reporting, the avoidance of plagiarism, and, most importantly, ensures the welfare, dignity and safety of all sources. A two-day training on research methods and ethics was conducted prior to the start of the field work.

Integration of a rights-based approach, including gender integration

- The use of a rights-based approach was key to ensuring that the research took into account the perspective of a wide range of stakeholders, particularly vulnerable groups and those whose voice is not often heard. In Uganda, these vulnerable groups include women, children and migrant groups.
- In order to achieve a rights-based approach with regards to gender relations, a gender analytical framework was incorporated in each of the tools developed for the research. This ensured the full involvement of both men and women stakeholders and allowed for a holistic picture of the sector to be presented in this report.

Teaming considerations

- The field researchers were split into two teams, (Team 1 and Team 2), taking into account technical expertise, years' experience and ability to speak native languages in order to ensure an equal balance between teams. The split enabled the field team to cover the maximum possible area in the time allocated for fieldwork for this project. This facilitated the collection of data from a wide range of districts across the country. A representative from DGSM was also appointed to accompany Team 2 to facilitate access to mine sites and local government offices, contribute technical expertise and for knowledge sharing purposes between the research team and DGSM.

Activities Undertaken

Central Stakeholders

Central stakeholders were interviewed to supplement information collected during field assessments and from secondary data concerning all components of the study. 9 interviews were conducted with 7 officers in the Directorate of Geological Survey and Mines representing offices concerning geology, cartography, licencing, geodata as well as the National Bureau of Standards, Central Materials Laboratory, National Environmental Management Authority (NEMA), and Makerere University (College of Engineering, Design, Art and Technology, and the Department of Geology and Petroleum Studies). Public secondary data from central stakeholders (e.g. the Uganda Bureau of Statistics (UBOS)) was also used to supplement, triangulate and extrapolate data collected in the field.

Field Research

Organization and preparation of field research

The organization and preparation of the fieldwork comprised of the following activities:

- Research team training
- Logistical organization of field work, including accessing vehicles and drivers, setting up initial meetings in prospective districts and finalizing the field work itinerary
- Field testing of the tools in nearby sites and points of sale
- Refinement of the tools based on results of field testing
- Finalization of team composition
- Finalization of field work implementation plan

Field research

As mentioned above, field research was conducted in 22 districts across all five regions of Uganda. Table 2 gives a breakdown of the distribution of sites by region and commodity.

Table 2: Number of Districts, Sites and SMEs or Points of Sale (POS) Assessed by Region and Commodity

COMMODITY ¹	REGION															TOTAL		
	Central			Western			Southwest			Eastern			Northern					
	Districts	Sites	POS	Districts	Sites	POS	Districts	Sites	POS	Districts	Sites	POS	Districts	Sites	POS	Districts	Sites	POS
Clay & Clay Bricks	4	6	1	2	2	3	1	3	4	1	1	1	1	1	1	11	13	10
Stone Aggregate	2	5	8	1	0	4	2	2	9	2	1	1	4	3	4	12	11	26
Dimension Stone	2	3	4	1	1	1	0	0	0	1	0	1	2	2	1	7	6	7
Sand	2	4	10	1	0	5	2	2	9	1	1	1	2	2	3	9	9	28
Limestone/ Lime	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	2	2	1
Kaolin	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1
Salt	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1
Pozzolana ²	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1
Total	4	20	19	3	4	17	4	9	27	5	4	3	4	6	8	22	42	73

Notes:

¹ Following consultations with DGSM and other sector stakeholders, it is evident that gypsum production in country (formerly undertaken in Bundibugyo District) has ceased. In lieu of this, field teams assessed pozzollanic ash production sites (a substitute for limestone in cement production) in order to obtain additional insight on implications for the limestone market.

² Although pozzolana was not one of the 8 minerals chosen as focus minerals for this project, a limited assessment of production in the west was undertaken during the fieldwork, and have been incorporated in the findings of this report as an additional mineral.

Field research comprised of the following activities:

- Consultative meetings and interviews with local government
- Comprehensive ASM site assessments, which comprised of individual interviews as well as focus group discussions with ASMs and on-site traders
- Interviews with owners and employees of small businesses engaged in the wholesale and/or trade of Development Minerals.
- Rapid enumeration of ASM sites and points of sale, to collect key information for the baseline and value chain analyses

Sampling

Sampling of sites and individuals from which data could be collected during the fieldwork phase was conducted using pre-existing research techniques, tailored to the Ugandan Development Minerals context. The chosen techniques are outlined below, and the number of sites and individuals sampled (by commodity) during the course of field research are summarized in Tables 2 and 3.

Sampling techniques were selected based on the research team's prior knowledge of the Development Minerals sector in Uganda, and differed depending on the stakeholder segment. In all cases, some purposive sampling was conducted by the research team to supplement potential gaps in the sampling base, prevent exclusion of any stakeholder groups, and to ensure as far as possible that a representative sample was achieved. Selection and number of ASM sites and nearby trading centres where points-of-sale are located was based on:

- Adequate regional coverage – given the widespread nature of Development Minerals occurrences, it was essential that each region of the country was covered
- Purposive sampling on the basis of areas of intensive, contentious or previously neglected activity
- Purposive sampling on the basis of single or few production areas for some commodities
- Resources and time to carry out the work – these were limitations to data collection in the field, and were taken into account when conducting sampling, in order to ensure that resources were used in the most efficient manner

Sampling of participants within ASM sites and communities for the ASM site assessments was based on a number of strategies, as described in the inception report:

- Snowball sampling – initial interviews and discussions led to referrals for key people to speak to
- Purposive sampling – this played a more significant role than the snowball sampling. At each site, according to sampling strategies agreed on during the team training, the research team ensured, as far as possible, coverage of the following aspects:
 - Individuals from each step of the supply chain present on site

- Gender, targeting 1:1 gender parity
- Relative vulnerability, ensuring that those with less 'voice' were featured
- Self-selection by ASM community members for focus group participation – the initial individuals consulted on site were asked to identify 8-12 relevant participants for focus group discussions. The technique of self-selection for focus groups was chosen in order to mitigate against researcher bias, as well as to promote engaged conversation by ensuring that all participants were taking part in the discussion of their own volition. The potential risk that self-selective sampling would exclude certain participants who lacked a strong 'voice' in their community, such as vulnerable women, older participants, migrants and others, was minimised by supplementation with purposive sampling, where care was taken by the researchers to select additional participants who may otherwise have been excluded, but who they felt would benefit the focus group discussion. The demographic of focus group participants varied by site, according to what was appropriate for each particular context. Focus groups might be men or women only, mixed genders, a variety of roles within the site, and/or a variety of ages.

Sampling for rapid enumeration of ASM sites and points of sale was done according to practicality of access to the site. All sites at which rapid enumeration took place were either next to a road on which the research teams were already travelling, or nearby to a site assessed with the ASM site assessment tool.



Figure 3: Moreen Nanteza (Levin Sources) carrying out a site assessment at Kyalusowe mine site (Photo credit: Olivia Lyster (Levin Sources), 18th July 2017)



Figure 4: Focus group discussion with women miners at Lake Katwe (Photo credit: Jennifer Hinton, Levin Sources.24th July 2017)

Sampling of points-of-sale and shops engaged in buying and selling Development Minerals and their products, as well as related inputs (tools, equipment), was purposive, selected according to practicality of access, referral by members of the ASM community, and, normally, location within or nearby a trading centre.

Table 3: Number of Sites Assessed, Persons Interviews & Focus Group Discussions Conducted byCommodity

Commodity ¹	Research Methods Employed										Total no. of participants in Interviews & FGDs			
	ASM Site Assessments			Rapid ASM Enumeration	SMEs & POS ²		Local Government ³		Central Stakeholders					
	Sites	No. of participants in interviews	No. of participants in FGDs		Sites	No. of participants in interviews	SME/POS	No. of participants in interviews and FGDs	Districts	Interviews	Entities	Interviews	Men	Women
	Clay & Clay Bricks	9	49	17	4	4	9	20	10	24	14	20	76	14
Stone Aggregate	12	89	47	1	0	22	58	117					77	194
Dimension Stone	6	34	26	0	0	6	11	38					33	71
Sand	6	50	8	3	2	25	73	118					15	133
Limestone/Lime	2	7	3	0	0	2	4	14					0	14
Kaolin	1	4	0	0	0	2	1	4					1	5
Salt	1	1	21	0	0	1	22	7					15	22
Pozzolana	0	0	0	1	2	0	0	2					0	2
Total	31	200	96	9	8	39	106	10	24	14	20	329	125	454

Notes:

¹ Focus group discussions were carried out at ASM sites. FGD group size ranged from 3-12 persons depending on site conditions. Wherever possible, both women and men were interviewed although at some sites, women were largely absent. In recognition of this, additional efforts were made to have women-only focus groups and interviews at those sites where they were present.

² At most SMEs and Points of Sale, both the SME Interview Guide and Rapid Enumeration Tool were used. In addition to the absence of women at some sites, women were found to be less likely to be employed in SMEs, which was also a factor contributing to their lower representation in interviews.

³ Some consultative meetings and interviews with Local Governments were held as group interviews (e.g. in Kabale District, the NRO, DEO, CDQ, Head of the Planning Unit, District Planner and Regional Mines Officer). Number of interviews, therefore, shows the number of individuals interviewed, either individually or in groups.

Stakeholder Validation

Stakeholder validation was conducted during a multi-stakeholder validation workshop in Kampala on Nov. 14th and 15th. The event drew almost 70 participants from central and local government, civil society, private sector, and ASM communities who reviewed and provided concrete input to inform finalization of this report.

BOX 2: APPROACH TO ESTIMATION OF ASM PRODUCTION, EMPLOYMENT AND INCOMES

Given that the majority of the Development Minerals ASM sector⁷ is operating informally, data concerning the magnitude of the sector's activities is extremely limited. Methods varied by commodity and drew from, wherever available, official statistics with assumptions and resulting calculations informed by the following:

- **Solid, burnt clay bricks production (no. of bricks, value).** Total production (by ASM, MSM, LSM) was assumed to equal consumption. Consumption related to residential construction was determined from national statistics on: rural and urban housing construction rates (MHUD); household surveys indicating the proportion of houses constructed using burnt clay bricks for walling materials (UBOS Statistical Abstracts), calculation (by average house size) of the average number of bricks used in an average Ugandan house (see MEMD, 2009); 2015 applications to 9 municipalities and 60 town councils for construction of commercial, industrial, institutional and other non-residential buildings (UBOS, 2015). As a limited number of medium sized clay brick producers (e.g. Nkozi Clays, Butende Brickworks) are producing solid, burnt bricks (with the largest clay companies, Uganda Clays and Lweza Clays Ltd., only producing other specialty clay products), clay brick production by MSM-LSM was assumed to constitute only 5% of solid, burnt clay brick production.

An average of ASM ground sale prices at different operations were used to determine ASM value. In the case of MSM-LSM, the consumer price index was used to determine value.

- **Sand and stone aggregate production (tonnage, value).** Total production (by ASM, MSM, LSM) was assumed to equal consumption. Although concrete mixes vary depending upon the operator, a ratio of 1:2:4 by volume (or 1 tonne of cement: 1.7 tonnes of sand:3.3 tonnes of aggregate by weight) was taken as an average mix. Consumption of sand and aggregate was therefore derived from national cement consumption statistics (UBOS, 2015). As MSM-LSM companies also serve major civil works projects (e.g. aggregate for road or rail line base) and estimates exclude these projects, it was assumed that only 10% of production included in the estimate is attributed to MSM-LSM.

An average of ASM ground sale prices at different operations were used to determine value.

- **Limestone production (tonnage, value).** Official DGSM statistics on limestone production were used for LSM, with this exception of production volumes attributed to Tororo Cement Ltd. concessions in Karamoja (attributed to ASM). Production additionally included site level production estimates for limestone and lime by ASM obtained during field research in Tororo and Kasese Districts, which used local sales prices for different products.
- **Kaolin, pozzolanic ash and vermiculite production (tonnage, value).** Official production and value statistics from DGSM were used. Kaolin production is licenced by ASM operators. Recent research on pozzolanic ash indicates that only 10% of all pozzolla production is sourced from ASM (Bread for All, 2017). Vermiculite is 100% produced by LSM in one operation in the country.
- **ASM employment and incomes in clay, sand, stone aggregate and dimension stone.** Considerable field data was collected to determine individual annual production capacity for these commodities at different units in the operation (steps in the production system). This was cross-checked with site level production capacity and numbers of workers at different operations. Total employment was estimated based on production divided by the average individual production capacity for each of the commodities. Gender division of labour and payment for different tasks at each step in the production system (e.g. crushing, hauling, moulding) were used to estimate incomes, cross-checked against reported incomes. Both average annual incomes and annual individual production capacity accounted for seasonality, number of days worked per week, number of hours per day.
- **ASM employment and incomes in limestone, kaolin and pozzolanic ash.** The number of ASM sites are limited thus primary field research informed estimated total employment for kaolin and limestone/lime in Kasese and Tororo Districts. Tororo estimates were supplemented by input from the DGSM Mines Warden in the regional office. More comprehensive published estimates on pozzolanic ash (Bread for All) and limestone in Karamoja (ECO) was used to supplement primary research results.

Most estimates are believed to be conservative.

Other uses of certain commodities, other than those specified above, are excluded from estimates. For instance, a more comprehensive estimate would also include use of bricks in border walls, use of stone aggregate (hardcore) as foundation stone, walling and border walls; use of sand in plaster and use of pozzolanic ash as building stones.

Clay, in particular, may also be considerably underestimated as non-residential structures were included for only a fraction of urban areas (i.e. 9 municipalities and 60 town councils in the country).

⁷ Please note that any reference to 'ASM' in this box refers to Development Minerals ASM

Research Limitations

Limitations and challenges encountered during the project include the following:

- The Development Minerals sector is largely undocumented – robust data exists only on some regions of Uganda, or specific mine sites or ASM communities. To fully document the sector would require a comprehensive census and statistically significant samples survey (both of which would require several months of research). The methodology chosen as most appropriate for this study, which seeks to provide an overview of the sector in order to identify targeted interventions, meant that samples collected were not adequate for statistical interpretation. In order to overcome the inevitable time, human and financial resource limitations, sampling strategies ensured that all data collected provided a reasonable representation of the sites visited and, as far as possible, the sector. A reliable level of accuracy was achieved through rigorous triangulation of data obtained through qualitative methods and comparison with pre-existing published research.
- Similarly, the large size of some sites (e.g. stone quarries spanning approx. 1km lengths and employing up to 1,000 workers) precluded extended assessments of the whole site. Geo-data was used to extrapolate the data collected at these sites.
- Access to sites was limited and travel times increased in some cases by heavy rains, long-distances between regions and districts, vehicle problems and a delay in team member mobilization.
- Variation between sites in terms of scale of activities, the presence or absence of organizing structures and variety of products produced presented a challenge for systematic data collection across sites. Other challenges included lack of interviewee time, lack of interviewee transparency or knowledge about certain issues (some interviewees did not know their own income), and fluidity of roles, where the same individual might perform different roles and earn different amounts on the same mine site at different times.
- Inadequate to non-existent record-keeping at ASM sites or POS posed a challenge to the validation of historic data.
- Whilst the field research used methods to assess the impact of seasonality of production, workforce etc. the fieldwork was conducted over a 1 month period and therefore cannot be said to map in detail changes in profile over the course of the year. Due to this uncertainty, related estimates were conservative. For example, where rainy season production and workforce was reported to drop by about 50%, it was assumed that, of the workforce working in that season, their individual productivity was also halved (resulting in overall production decreases of 75%). Such uncertainties were accounted for on a site-by-site basis according to the reliability of the data sources (e.g. capacity to effectively triangulate responses) at different sites.

Profile of the Development Minerals Sector

This section outlines the broader context within which Development Minerals production takes place in Uganda. It gives an overview of Development Mineral occurrences in Uganda, as well as covering production, import and export data for Development Minerals mining, from artisanal and small-scale, to medium and large-scale operations. With a focus on ASM, it concludes by outlining the principle social and economic characteristics of the sector.

Development Minerals Context

A land-locked country located in East Africa, the Republic of Uganda was one of the 15 fastest growing economies in the world from 1987-2010 with GDP growth averaging at 7% per year, declining significantly to 3.9% in Fiscal Year (FY) 2016/17^{8,9}. Although Uganda has made significant progress towards the millennium development goals, including by achieving the target of halving the number of people living in extreme poverty before 2015, 25% of Ugandans still live below Uganda's poverty line.¹⁰

Main development achievements and challenges also related to the following:

- *Literacy rates for children over age 15 years are 78%*. This, in large part due to government provision of free primary and secondary school education, but dropout rates are ca. 68%. This is mainly attributed to hidden school costs and mainly poverty driven requirements for child labour, with an estimated 30% of 5 to 14 years olds engaged in some form of child labour, primarily in agriculture and mining of sand and gold¹¹.
- *Urbanisation rates in Uganda are soaring*, with a predicted urban population of 20 million by 2040, compared with 6 million in 2013.¹² Whilst the opportunity for development is high, as urbanisation tends to draw populations closer to economic opportunities, the infrastructure required to sustain such a fast-growing urban population is significant, and poses an important development challenge to the country. Development Minerals will undoubtedly play an important role in addressing this challenge.
- *Employment rates in Uganda are low*, posing a challenge to sustaining a growing, young population. In a context where, in 2015, only 52.8% of the total working age population are economically active¹³, not accounting for the informal sector, the Development

⁸ "Uganda Overview." Accessed November 1, 2017. <http://www.worldbank.org/en/country/uganda/overview>. "GDP per Capita (Current US\$) | Data." Accessed November 1, 2017. <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=UG>.

⁹ Ibid.

¹⁰ "Millennium Development Goals Report for Uganda 2013." Ministry of Finance, Planning and Economic Development, n.d. <http://www.undp.org/content/dam/undp/library/MDG/english/MDG%20Country%20Reports/Uganda/Uganda%20MDG%20Report-Oct%202013.pdf>

¹¹ United States Department of Labor. (2016). Findings on the Worst Forms of Child Labor - Uganda. Accessed October 10th, 2017. <https://www.dol.gov/agencies/ilab/explore-our-resources/reports/child-labor/uganda>.

¹² World Bank (2015). Managing Rapid Urbanization Can Help Uganda Achieve Sustainable and Inclusive Growth. <http://www.worldbank.org/en/news/press-release/2015/03/03/managing-rapid-urbanization-can-help-uganda-achieve-sustainable-and-inclusive-growth>

¹³ UBOS (2015a): 2015 Statistical Abstract. October 2015. Uganda Bureau of Statistics, Republic of Uganda. Kampala (UG). http://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/Statistical%20Abstract%202015.pdf

Minerals workforce plays an important part in the employment of those who are not able to access other economically viable livelihoods, typically the most vulnerable members of a population.

- *Uganda's birth rate is one of the highest in the world* with an estimated 5.8 children born per woman in 2016, and the resulting rapid population growth rate and young median age (53% between 0-14 years) will put increasing strain on the country's education and health care systems and threaten economic development. There are an estimated 700,000 new entrants in Uganda's job market annual but the absorption capacity of most sectors is low.¹⁴,
- *Agriculture is the mainstay of the economy.* Approximately 85% of the population lives in rural areas and farming provides a source of livelihood for 65% of Uganda's labour force¹⁵, 58% and 70% of whom are men and women, respectively¹⁶. In 2016, agriculture constituted 26% of the GDP¹⁷.
- *Environmental pressures are increasing.* Given the current population of ca. 38 million and density of 195 persons/km², increasing strains on land pose serious risks to achievement of Uganda's commitments to the 2015 Sustainable Development Goals (SDGs) and broader national development objectives¹⁸. Climate change is expected to amplify these pressures further, leading to a potential increase in the frequency of extreme events such as floods.¹⁹.

Against this backdrop, the Government of Uganda (GoU) has prioritized job creation and massive infrastructure improvements among critical development priorities outlined within its Uganda Vision 2040. In support of this, GoU has embarked on a drive to stimulate economic growth, reduce business costs and support progress towards industrialization including through rehabilitation, maintenance, upgrading or construction over 30,000 km² of roads, construction of key bridges and significantly increasing its power generation capacity to 827MW through hydropower generation²⁰. To support the burgeoning population, GoU additionally aims to construct 1.6 million housing units by 2020²¹.

¹⁴ World Bank (2016) and www.data.un.org/countryprofile.asp?crName=uganda and cited in: Barreto et al. (2017).

¹⁵ UBOS (2017). Uganda National Household Survey. Accessed 5th October 2017. http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/UNHS_VI_2017_Version_I_%2027th_September_2017.pdf

¹⁶ "UNdata Country Profile Uganda." Accessed October 11, 2017. <http://data.un.org/CountryProfile.aspx?crName=Uganda>.

¹⁷ "Deloitte Touche Tohmatsu Ltd., 2016, "Uganda Economic Outlook 2016: The Story Behind the Numbers", Accessed Dec 26, 2016"

¹⁸ The World Factbook – Central Intelligence Agency." Accessed November 1, 2016. <https://www.cia.gov/library/publications/the-world-factbook/geos/ug.html>.

¹⁹ Caffrey, P, Finan, T. et al (2013) Uganda Climate Change Vulnerability Assessment, USAID Report, 78p.

²⁰ Deloitte (2016).

²¹ "Quality of Uganda's Education and Health Services Poses Serious Risk to Long-Term Economic Progress." Text/HTML. World Bank. Accessed November 1, 2016. <http://www.worldbank.org/en/news/press-release/2013/11/19/quality-uganda-education-and-health-services-poses-serious-risk-long-term-economic-progress>.

The GoU additionally recognizes that micro-, small- and medium-scale enterprises (MSMEs) constitute 90% of Uganda's private sector and contribute 20% of the GDP and, through its current National Development Plan, has elaborated a multi-faceted MSME Policy that seeks to address current legal, institutional and other challenges, including those related to MSME access to information, training, support for product standardization and marketing.

GoU's objectives concerning infrastructure development, employment generation and economic transformation are explicitly linked with the minerals sector. In this respect, Uganda Vision 2040 expects that the minerals sector will become a *"major driver in employment creation... will spur growth in the manufacturing, infrastructure development, agriculture and ICT industries"*²². Vision 2040 places particular emphasis on downstream beneficiation and value addition to provide additional means to stimulate employment and redress trade imbalance and reliance on imports. The achievement of Vision 2040 is catalyzed by the current National Development Plan (NDP II) that runs from the year 2015 – 2020. The anchor of this second National Development Plan is the strengthening of Uganda's competitiveness for sustainable wealth creation, employment and inclusive growth. This is to be achieved through strengthening of the fundamentals – such as establishing and improving strategic infrastructure including transport in the form of roads, bridges, railways and energy as well as human capital development; while harnessing the opportunities inherent in the high growth sectors with multiplier effects such as mining, agriculture, tourism. Uganda's mining sector is crucial to the achievement of all four (4) objectives of the National Development Plan II.

Although much focus in the minerals sector is often placed on higher unit value commodities such as gold, copper and cobalt, emphasis on Development Minerals is clearly warranted. Fuelled in large part by demands of a population expanding at 3.3% annually, the construction industry is growing at 6%/yr and, with it, demand for a broad range of "building minerals" including sand, clay, limestone, marble, kaolin and sources of stone aggregate^{23,24}. Further to this, large scale vermiculite and phosphate mines are in production and development, respectively, and have potential to benefit agricultural production and a range of other sectors.

Despite high levels of interest in attracting investment in industrial, large scale mining of these minerals, ASM is believed to be responsible for a large percentage of current production and employment in the Development Minerals sector. ASM is, however, largely informal throughout the country and its development contributions, risks and opportunities have been, to a great extent, invisible. It is against this backdrop of increasing understanding of the importance of the sector balanced with an awareness of an acute lack of data on the subject that the Baseline Assessment and Value Chain Assessment was commissioned.

²² GoU (2010), "Uganda Vision 2040", publ. Uganda Printing and Publishing Company Ltd. (UPPC), p51.

²³ Cathy Nyakecho, Directorate of Geological Survey and Mines, presentation to UNDP.

²⁴ Hinton, J. 2009, *National Strategy for the Advancement of Artisanal and Small Scale Mining in Uganda*, Report to Ministry of Energy and Mineral Development (MEMD), 144p.

BOX 3: SNAPSHOT OF UGANDA²⁵**GENERAL INFORMATION****Country Name:** Republic of Uganda**Capital City:** Kampala**Total Population (2014):** 34,634,650**Total Country Area:** 241,551 km²

17,060,832 males; 17,573,818 females

Total Land Area: 200,523 km²

7,425,864 urban; 27,208,786 rural

Altitude: 620-5,111 metres (ASL)**Population density:** 173 persons/km²**Temp:** 16-30° C (annual mean)**ECONOMIC AND SOCIO-ECONOMIC INDICATORS (2012/13)****GDP growth rate :** 5.0 % at constant (2009) market prices**GDP Contribution of Agriculture:** 24.0%**Absolute Poverty (% pop'n):** 19.7%**% population not working:** 22% of 14-64 year olds**Pupil Teacher ratio:** 46 (primary) 58 (secondary)**HEALTH INDICATORS (2014/15)****Maternal Mortality Rate:** 438 in 100,000**Infant Mortality Rate:** 53 in 100,000

56 males; 48 females

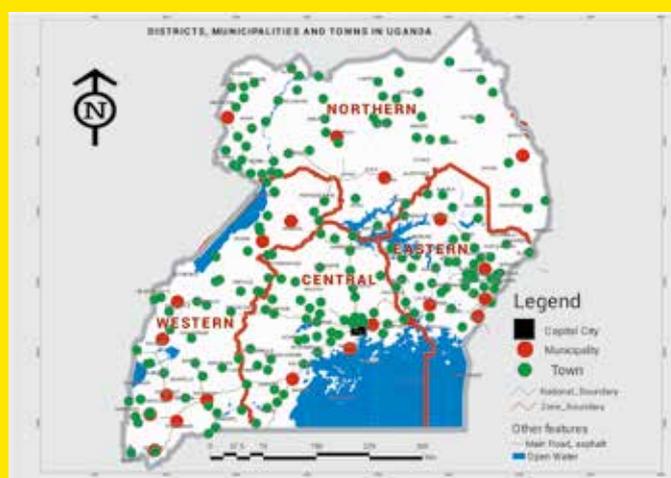
Life Expectancy at Birth: 63.3 (62.2 males, 64.2 females)**Children less than 5 Years who are Severely Anemic:** 15%**Children less than 5 Years who are Stunted:** 33%

Figure 5: Map of Uganda showing location of 4 regions, 111 districts, municipalities, towns and the capital city, Kampala (Source: Kombo, F. And Naulo, G., 2017)

²⁵ UBOS (2016), The National Population and Housing Census 2014 – Main Report, Kampala, Uganda

Range, Geographic Distribution and Markets of Development Minerals

This section provides an overview of the various types and general locations of main Development Mineral occurrences, deposits and mines, known mineral resources and reserves and current and potential products and uses of Development Minerals commodities in Uganda.

Diversity and Distribution of Mineral Occurrences and Deposits

A broad range of Development Minerals occur in Uganda, including, a range of stones used to produce stone aggregates and dimension stone, limestone, vermiculite, sand, clay, bentonite, gypsum, kaolin, pozzolonic ash and salt^{26,27}. Occurrences of semi-precious gemstones have been reported in Uganda, particularly within the Karamoja Region of the northeast²⁸, however, production is marginal and mainly attributed to neighbouring Kenya. A full list of Development Minerals that occur in Uganda can be found in Table 4.

Table 4: Main Development Minerals that occur in Uganda

Industrial Minerals	Construction Minerals	Dimension Stones	Semi-precious Stones*
Limestone/marble	Limestone	Granite	Quartz, Amethyst
Kaolin	Sand	Marble	Feldspar
Bentonite	Clays:	Slate	Chalcedony
Pozzolanic ash	Common ball clay	Sandstone	Garnet
Salt	Fire clay	Slaty quartzite	Malachite
Gypsum	Kaolin	Gneiss	<i>* although mineral occurrences can be found, few are of sufficient quality or quantity for extraction</i>
Phosphates	Stone suitable for quarrying:		
Vermiculite	Quartzite,		
Diatomite	Sandstone		
Fluorspar	Phyllite,		
Talc	Gneiss,		
Asbestos	Pozzolanic ash		
Graphite	Granitoids (e.g. syenite, granodiorite, granite)		
Mica			
Sand, glass quality sand.	Gypsum		

The geographic distribution of Development Mineral occurrences and production sites is shown in Figure 6. Although the diversity and number of mineral occurrences is extensive, exploitation is limited to specific commodities and localities as summarized below.

²⁶ Multiple references cite these commodities. A detailed list is provided in Annex 1.

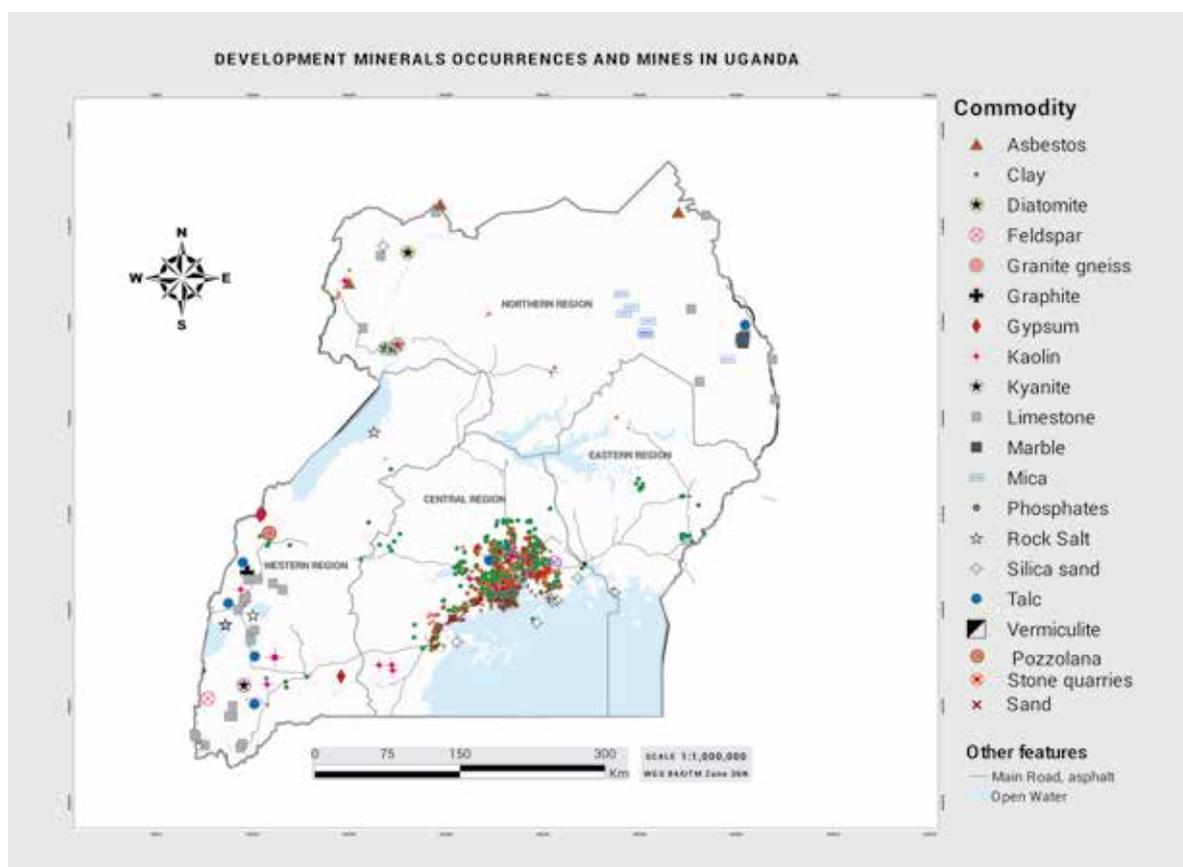
²⁷ This list excludes phosphates, which is yet to come into production and will exclusively be produced at a large, industrial scale.

²⁸ J. Hinton I Kabongo, C Kabiswa. et al. (2011). The Mining and minerals sector in Karamoja region: Development opportunities and constraints. Kampala (UG). ISBN: 9789970405008. <http://ecouganda.org/attachments/article/112/THE%20MINING%20AND%20MINERALS%20SECTOR.pdf>.

Overview of Minerals Occurrences and Deposits

General geologic and geographic characteristics of the Development Minerals occurring in Uganda are summarized below, with the location of known mineral occurrences shown in Figure 6, and a more detailed map of occurrences around Greater Kampala can be found in Figure 7. Annex 1 provides a more detailed map of mineral occurrence locations with geology and outlines additional details on the geologic, geochemical and mineralogical characteristics of different occurrences and deposits of significance for future sector development. Annex 2 provides a list of main production sites in the country.

Figure 6: Map of Development Minerals Occurrences and Mines in Uganda (Kombo, F. And Naulo, G., 2017). Detailed geological maps provided in Annex 1. January 2018



Common Clays

Most clays in Uganda are of sedimentary origin and were derived from extensive weathering, erosion and alteration of Precambrian gneissic and granitoid rocks.²⁹ The majority are classified as “ball clays”, which are very plastic and have low wet-to-dry shrinkage, making them well suited for moulding and production of ceramics such as bricks, pots, drainage pipes and floor and wall tiles. Many clays assessed in Central Uganda are also classified as “fire clays”, which are suitable for production of refractory (high temperature resistant) bricks.³⁰

²⁹ Nyakairu a, G.W.A, Kurzweil, H., and Koeberl, C., 2001, Mineralogical, geochemical, and sedimentological characteristics of clay deposits from central Uganda and their applications, *Journal of African Earth Sciences*. 35:123–134.

³⁰ Ibid.

Deposits of glass quality silica sand are found along the shores of and on islands within Lake Victoria at Bukakata, Dimu, Nyimu, Nyabu, Nakimuli, Kome Island, Kabugoga and Entebbe. No in-country glass manufacturing is taking place and most sand extracted from these sites is used for construction purposes, mainly as the finer fraction of aggregate in cement production³².

Stone Aggregates

Stone aggregates are stones that are crushed within specified size ranges in order to meet requirements of the construction sector, mainly for its use with cement in the production of concrete.

A variety of rock types are exploited for aggregate production throughout the country, with some variation depending on the scale of producers. ASM extraction is primarily of quartzite, slaty quartzite, sandstone, phyllite, gneiss, pozzolanic ash and to a lesser extent granodiorite. The majority of ASM production is from slightly to extensively fractured and/or relatively soft (e.g. phyllites) or weathered rocks better suited to manual exploitation. Large scale extraction – typically using explosives, blasting and mechanized means - is mainly of much harder and often massive granitoids (syenitic granites, granodiorites) and, to some extent, quartzite, which are generally more likely to meet market specifications (e.g. hardness, compressive strength).

Although stone aggregate quarries are dispersed throughout the country, exploitation is most intensive within and around densely populated urban centers (Figure 6). At least 316 stone quarries can be found in a 150km radius of Kampala (Figure 7), where both industrial and ASM production takes place. A number of other large, industrial quarries are also found dispersed throughout the country, many of which are temporarily developed to meet requirements of large road works or major infrastructure projects (e.g. hydropower dams).

Dimension Stones

Dimension stones refer to slabs or blocks produced from natural stones that meet basic dimension requirements (length, width, thickness, shape) and suitable for use as rough or cut tiles, countertops, tabletops and similar applications.

A large number of ASM stone aggregate quarries in Uganda also produce dimension stones, particularly when rocks are strongly foliated and layered, allowing for production of fairly thin (2-10cm thick) slabs. Just under half (42%) of stone quarries assessed produced dimension stones alongside hardcore and aggregate of different sizes, with main rock types including slaty quartzite, phyllite, sandstone and, in one case, a banded gneiss. Only a fraction of ASM quarries only produce dimension stones³³. Most of these exploit extremely soft, fissile and comparatively less durable and lower value mudstone/siltstone type rocks that are completely unsuited to aggregate production (and questionable for dimension stone applications). These production sites appear to be quite small, such as that found along the Lyantonde-Mbarara Road in southwest Uganda.

³² Some have indicated that glass quality sand is being exported for the purposes of glass production. See section on “Environmental, Occupational and Social Impact Analysis: Social and Economic Impacts and Management Measures: Socio-Economic Impacts on Individuals, Households and Communities: Child Labour and Child Rights” for additional details.

³³ Percentages have not been accurately determined but shall be evaluated through assessment of consumption of siltstone/mudstone slabs and sold mainly for exterior purposes.

Proximity of deposits to markets, ease of obtaining blocks or slabs (i.e. due to natural foliation or layering) and to some extent durability and hardness (except for mudstones/siltstones) seem to be more significant factors in selection of dimension stones for ASM extraction rather than properties such as colour, texture, surface finish and chemical resistance. Although the market is growing, only a small percentage of ASM dimension stones are cut into tiles, mainly in the Kampala area, while the remainder are “naturally sized”, rough edged blocks and slabs used mainly for walkways, exteriors and compound walls (Figure 8).

Despite a growing number of cutting and polishing companies importing blocks of granite, marble and slate into the country, medium to large scale, semi-mechanized or mechanized production is limited to a few quarries cutting blocks of granite, sericite schist, amphibolites, sandstones and meta-sandstones³⁴. Marble deposits in Karamoja were briefly exploited until recently by one small- to medium-scale company prior to management issues halting operations.

Nevertheless, Uganda boasts a wide diversity of other rocks that are well suited for production of cut and polished dimension stones. These range from pink, grey, reddish, greenish and black granites to black, banded and foliated gneisses to pink and white marble, dolomite and limestones, among others³⁵. Despite known occurrences of “specialty” types of rock, such as gypsum (alabaster) and massive talc (soapstone), it seems that these localities have not been assessed for the purpose of dimension stone production or are lacking adequate properties. Despite its high value as a dimension stone, travertine marble at Dura in Kamwenge District is currently being exploited for cement production.

Figure 8: Dimension stones at Kabale (left) and Mbale (right). Credit Levin Sources (left) and ECO Uganda (right)



³⁴ Granite block production by Building Majesty is the only extraction site licenced according to the Mining Act (2003). One major stone tile manufacturer reports also sourcing granite, marble, venturine, quartzite, amphibolites and sandstone from Mukono, however, marble and venturine are not known to be found in the area and these (as well as the other stones) may actually be sourced from elsewhere.

³⁵ V. Kato. (2008), Dimension stone industry status in Uganda. <http://ugandajournalistsresourcecentre.com/wp-content/uploads/2013/06/dimension-stone-industry-status-in-uganda.docx>

Marble and Limestone

Limestone, a hard calcium carbonate sedimentary rock, and marble, its metamorphic equivalent, are key constituents in the production of cement. Important deposits are found in Western Region (Hima, Dura, Muhokya, Kaku River), Eastern Region (Tororo), and the Northern Region (Moyo and, in the Karamoja sub-region: Rupa, Koseroi, Tank Hill, Matheniko, Pule and Lolung).

Large-scale (LSM) production of limestone and marble is undertaken mainly by large cement companies in the west (Kasese, Kamwenge), east (Tororo) and a number of sites across the Karamoja Sub-region in the northeast. ASM production is limited to specific sites in Western Uganda (Muhokya in Kasese District) and Eastern Uganda (Tororo), mainly for the production of lime, and as marble and limestone, in Northern Uganda (Moroto District) mainly under concessions held by large, formal companies.

Kaolin

Kaolin deposits are formed from the chemical weathering of feldspar-rich rocks, such as pegmatites and some siltstones and schists, to form high concentrations of the clay mineral, kaolinite. Deposits can be found throughout the country, most notably at Mutaka, Kibalya and Koki in Bushenyi, Sheema and Rakai Districts (Southwest Uganda), Moni in Mbale District (Eastern Uganda), Buwambo and Migadi Hill in Luweero District (Central Uganda) as well as pockets of small, sporadically exploited kaolin throughout Kabale District in the southwest³⁶. These deposits differ widely in terms of kaolinite, silica and iron oxide contents, brightness, yellowness and other characteristics determining suitability for different uses (e.g. in paint, ceramics, pharmaceuticals).³⁷

Currently, the Kibalya deposit is being exploited at a small scale, all of which is sold to Hima Cement Ltd. for use in the production of Portland Cement. The kaolin ranges in colour from white to pinkish, the latter of which is preferred by Hima due to its higher iron content. The deposit, which has been exploited for almost a decade, extends along strike for almost one kilometre, is at least 40m wide and is estimated to extend to depths of at least 50m.

Pozzolanic Ash

A type of volcanic ash, pozzolanic ash (pozzolana) is a silica-rich or silica- and alumina-rich rock that strongly reacts with limestone in the presence of water in order to form a strong, chemical resistant cement and to reduce requirements for more costly limestone³⁸. Exploited deposits are found on the western and to a much lesser degree on its eastern flanks³⁸ of the western branch of the Great Rift Valley in Kabarole and Rubirizi Districts, respectively, as well as in Kapchorwa on the slopes of Mount Elgon in Eastern Uganda.

In Kabarole, approximately 90% of production is attributed to mechanized companies (MSM) while the remaining 10% is extracted by ASM producers, both of which sell mainly to Hima Cement Ltd. and Kampala Cement Ltd. Production in Kapchorwa is undertaken by Tororo Cement Ltd. for their own purposes.

³⁶ T. Lehto, Y. Pekkala, et al, 2011, *Geological Mapping, Geochemical Surveys and Mineral Resources Assessment in Selected Areas of Uganda*, Report to the Ministry of Energy and Mineral Development, 146p.

³⁷ Analytical results of these deposits are provided in Annex X.

³⁸ Mathers, 1994, *The Industrial Mineral Resource Potential of Uganda*, British Geological Survey (BGS) Technical Report WG/94/1.

Bentonite

Deposits of another type of clay mineral, bentonite, are being extracted at a small scale in Rukungiri District in Southwest Uganda from two deposits, Burama and Ntungwa. Given that these deposits are 8 km apart combined with the windblown origin of these sediments, there is potential for other deposits within the area³⁹. Other smaller occurrences have been located near to Kaiso Village in Lake Albert as layers within Quaternary sediments, but are not currently being exploited.

Gypsum

Gypsum is a relatively soft sedimentary rock comprised mainly of hydrated calcium silicate that is in huge demand, mainly as it comprises about 5% of cement⁴⁰. The only known deposit occurs at Kibuku in Western Uganda (Bundibugyo District), where 300-400 tonnes per annum (tpa) were previously produced by artisanal miners. This was previously sold to Hima Cement Ltd., whose annual consumption requirement exceeds 40,000 tons. All cement companies, including Hima, therefore must import gypsum. Mineralogical (XRD) and chemical analysis by GTK indicates the gypsum is clear and pure although reserves are unknown⁴¹.

Salt

Salt deposits are located in Western Uganda at Lake Katwe and Lake Kasenyi in discrete, degazetted areas within Queen Elizabeth National Park in Kasese District, and at Kibiro in Hoima District. Salt comes in the form of a mixture of sodium and potassium chlorides, calcium sulphate and sodium bicarbonates, each of which has different applications. In the salt lakes, groundwater inflows through and dissolves salt within an underlying salt deposit (at a depth of ca. 40m) bringing salt-bearing brine to the surface. In Hoima, salt is leached and then re-precipitated from highly saline soils.

All current production is at an ASM level. At Lake Katwe, previous attempts to set-up an industrial plant to produce iodized table salt for human consumption (sodium chloride) failed due to technical design errors although larger investors are currently seeking the mineral rights for the area.

Semi-precious Gemstones

Semi-precious gemstones (garnets, quartz and amethyst) have been reported to occur in the Karamoja Sub-region in the northeast of the country. Fluorite, that is processed and refined (as fluorspar) at an industrial scale just across the Kenyan border, and low-quality corundum, which is commonly used as an abrasive, have been observed in abundance in Moroto, Tapac and Abim Districts, although neither are gem quality. Other regions of the country are also believed to be prospective for gemstones. In the southwest, amethyst and, in other localities, pink beryl (morganite) has been found associated with pegmatites in Ntungamo District. Large, clear quartz crystals can be found in many localities, mainly in association with hard rock gold and base metal (e.g. lead) mines. Although the quantity and quality appears to be too low to warrant extraction, occurrences of malachite and chalcedony have been observed, mainly reported during the course of exploration for other mineral commodities.

³⁹ Lehto et al (2011)

⁴⁰ Ibid.

⁴¹ Ibid.

Agro-Minerals and other Industrial Minerals

Particularly over the past decade, agro-minerals⁴² – rocks with potential to provide essential nutrients or favourably amend chemical or physical conditions of soil - are receiving greater attention in Uganda, particularly given their potential to contribute to declining soil fertility and increase agricultural productivity and the nation's food security. A range of suitable rocks and minerals occur in Uganda although most interest has been focused on Eastern Uganda, where deposits of phosphates at Sukulu and Bukusu and vermiculite at Namekhara can be found. Uganda additionally hosts potassium enriched volcanic rocks throughout Western Uganda (Kabale, Kabarole Districts) and under-explored occurrences of diatomite and zeolite.

A 300,000 tonne per annum mine is currently being developed to exploit the Sukulu phosphate deposit in Tororo District and additional investment in a fertilizer plant is planned at the producing Namekhara vermiculite mine to meet local market demands as most is currently exported for industrial markets (e.g. in manufacturing of brake pad, insulation)⁴³. With respect to ASM, production is limited to agrolime, with producers in both Muhokya and Tororo selling low-grade overburden to sugar refiners at Lugaizi in order to help neutralize soils as needed for sugarcane production.

Other Development Mineral occurrences throughout the country which also have potential industrial applications include talc, mica, feldspar and fluorspar⁴⁴.

Mineral Resources and Reserves

For several decades, the Geological Survey and Mines Department (now Directorate) has conducted geologic mapping, sampling and analysis of a wide range of Development Minerals in the country. Detailed mapping and assessments under the Sustainable Management of Mineral Resources Project (SMMRP) between 2004 and 2011 yielded updated geologic industrial mineral occurrence maps at scales of 1:50,000), mineral prospectivity maps (encircling areas of good potential) at 1:250,000 and a country-wide synopsis of mineral prospectivity, which included industrial minerals. Through this and other extensive work by DGSM, the geology of these and other Development Minerals deposits (e.g. salt) has been very well characterized.

Mineral resources have been measured (quantified) only for selected sites and minerals. Most work has been carried out by larger, industrial companies for the purposes of mine feasibility studies and mine design, planning and development (e.g. Hima Cement, Turo Cement, Gulf Resources). These studies tend not to be publicly available but few results available are supplemented by work by the DGSM to delineate and quantify certain deposits in order to infer resources.

⁴² Agrominerals are broadly defined by Stratten (2002), p. 14 as "naturally occurring nutrient providing rocks and minerals such as phosphate rocks, nitrogen and potassium salts, as well as other nutrient-providing rocks. It also includes 'soil amendments' including agricultural limestone and dolomite, and various ground silicate rocks. Some of these natural geological resources are only moderately soluble in the short term but can release their nutrient content into the soil over long periods of time as 'slow release' nutrient inputs. Agrominerals also include rocks and minerals that improve the physical status of soils. For example, perlite is used to enhance aeration in artificial growth media in greenhouses, vermiculite and zeolite are minerals able to store and release nutrients and moisture slowly, and volcanic scoria and pumice and other rocks are used as 'rock mulch' to reduce evaporation."

⁴³ Lubangakene, C. and Kedi, V., 2015, *Minerals Value Chain Analysis for Selected Minerals*, Presentation to the Presidential Industrial Round Table (PIRT) on Minerals Value Addition, Nov. 20, 2015.

⁴⁴ Mathers, 1994.

Mineral resources have been quantified to varying degrees of confidence including for the following deposits and those outlined in Annex 1⁴⁵:

- *Phosphates*: 230 million tonnes at Sukulu (13.1% P₂O₅); 50 million tonnes at Bukusu (12.8% P₂O₅)⁴⁶.
- *Limestone and marble*: Resources have been estimated at 14.5 million tonnes (Hima, Kasese); 11.6 million tonnes (Dura, Kamwenge); and over 300 million tonnes (Rupa, Koseroi, Tank Hill, Matheniko, Pule, Lolung in Karamoja)⁴⁷. “Best guesses” of resources at Muhokya in Kasese vary from 250,000 to 2 million tonnes⁴⁸.
- *Vermiculite*: 49.9 million tonnes at Namekhara in Manafwa District⁴⁹.
- *Sand*: Resources have been estimated at 2 million tonnes of glass quality sand (99.93% SiO₂, 0.05% Fe₂O₃) on Dimu and Bukakata Beaches on the Kome Islands⁵⁰.
- *Kaolin*: 300 to 540,000 tonnes (30% kaolinite) at Mutaka⁵¹.
- *Salt*: 22.5 million tonnes estimated at Lake Katwe (2 million tonnes NaCl; 2 million tons Na₂SO₄; 17.7 million tonnes NaCO₃, 0.6 million tonnes K₂SO₄ and 0.01 million tonnes KBr).⁵²

Aside from those listed above (e.g. Lake Katwe, Muhokya), resources at most ASM sites have not been delineated and quantified. The lack of understanding of the geological potential of ASM sites makes the provision of informed support to the sector more difficult, and is therefore a barrier to increased production by the ASM Development Minerals sector.

Current and Potential Products and Uses

Upon comparison between current and potential Development Mineral products (Table 5), it is evident that Uganda is producing and adding value to a wide diversity of minerals. Despite this, a vast number of products that could be produced in-country continue to be imported. This

⁴⁵ Commonly used classification systems (JORC, 43-101) differentiate between mineral resources and reserves. *Resources* refers to measurement of resources for which tonnage, grade and mineral content are quantified with a low, medium and high levels of confidence (inferred, indicated and measured resources, respectively). *Ore reserves* refer the economically mineable portions of measured or indicated reserves on the basis of geological evidence and related technical, environmental, social, legal and economic evaluations (typically in the form of a Feasibility Study). Reserves are categorized as probably or proven, depending upon the degree of confidence in evidence (Source: www.iluka.com). Although some resources and reserves have been reported in Uganda, the level compliance with international standards of evidence, proof and confidence is uncertain and likely varies.

⁴⁶ Lubangakene and Kedi, 2015.

⁴⁷ Ibid.

⁴⁸ Hester and Boberg, 2006

⁴⁹ Lubangakene and Kedi, 2015.

⁵⁰ ACEMP (2017), *Location and Nature of ASM Activities in Uganda*, accessed online 23 June 2017, <https://www.acementp.org/>

⁵¹ Hadoto (1993) cited in Lehto et al, 2011.

⁵² Ddungu, E., Driver, P., Katende, T., Kizibo, Y., Migisha, C., Nyangababo, J., Pomeroy, D., and E. Tukahirwa, (1998). Preliminary Environmental Impact Assessment of Lake Katwe Salt Plant, Western Uganda”, Unpubl. Report for Makerere University Institute of Environment and Natural Resources, Kampala, Uganda.

provides an important indication of the opportunities that Development Minerals present in terms their potential to contribute to economic diversification, stimulation of industrial sectors and mitigation of the trade deficit, which stood at 2.56 billion USD in 2016⁵³.

Table 5: Main Development Mineral Commodities and their Products in Uganda

Current Products and Main Uses in Uganda	Other Potential Products
FOCUS MINERAL: Clay	
Bricks: construction of houses and other structures; ventilators: aeration; half bricks: decorative covering (mainly exteriors); Pots, charcoal stoves, and water storage; Pompe: kitchen aeration; roofing tiles*; refractory bricks*	Sanitary ware, porcelain, hobbyware, dinnerware, coatings.
Bentonite Clay	
Food grade being sold to aid in detoxification , drilling*, foundry* and cosmetic use*, wastewater treatment*. ⁵⁴	Drilling mud (petroleum), purifier, absorbent (for example in pet litter), groundwater barrier, environmental and civil engineering applications, foundries and oil well drilling.
FOCUS MINERAL: China Clay (Kaolin)	
White Portland Cement-for construction	Manufacturing of paper, rubber, paint, sanitary ware, porcelain, pottery, leather tanning, filters, insecticides, pharmaceuticals, tiles.
FOCUS MINERAL: Sand	
Concrete production; Construction for grit and in bricks, plaster, concrete and mortar. Agricultural uses such as growing certain types of crops and dairy farming.	High quality silica sands are the principal component of common glass, sandbags, improving the traction of train wheels, textured paint.
FOCUS MINERAL: Stone Aggregate⁵⁵	
Concrete production; construction and manufacturing of concrete blocks, pavers, culverts etc. Applications typically according to size. Stone dust-(base material for asphalt roads; toilet slabs, flower pots, decors, pavers, culverts etc.); Use of crushed stones (3/4" up to 2-1/2") vary with size including acceptable size distributions for concrete, use as drainage rock, road base, heavy equipment foundations	Used with a binding in walls for shorelines and railroad construction, used a flux for blast furnaces used for septic systems and self-contained sewage treatment systems. ⁵⁶

⁵³ Global Edge. Global Insights. Uganda. Accessed 24th November 2017. <https://globoledge.msu.edu › Global Insights › By Country › Uganda>

⁵⁴ Expert Environmental. Accessed 1st November 2017. <https://www.environmental-expert.com/services/available-in-uganda/?keyword=bentonite+clay&redirectedToServing=1>

⁵⁵ Ministry of Energy and Mineral Development (MEMD) (2008). Small Scale Mining Handbook: A Guidebook for Improving the Performance of Artisanal and Small-Scale Mining in Uganda, New Vision Commercial Printers, publ., 432p.

⁵⁶ 9 Best uses for crushed stone. Doityourself Accessed October 9th 2017 <http://www.doityourself.com/stry/9-best-uses-for-crushed-stone>

Current Products and Main Uses in Uganda	Other Potential Products
FOCUS MINERAL: Dimension Stones⁵⁷ (Slaty quartzite, Slates, Sandstone, Phyllites, Gneiss, Mudstones, Siltstones)	
Rough stones and slates (exterior walls/cladding, flooring, pathways, boundary walls, etc). Some blocks (e.g. welded volcanic tuffs) used for house construction (walls, floors). Minor production of cut stone or cut and polished stone tiles, countertops, tabletops etc ¹ (mainly from imported blocks).	Terrazo cement tiles, marble chips and marble powder.
FOCUS MINERAL: Marble, Limestone, Lime	
Portland Cement production*. Lime also used in plaster, mortar, sugar refining and acid neutralization (treating metal sulfide mine effluent and waste). Minor use as agricultural lime (soil pH amendment) in sugarcane plantations.	Lime: Refractories, paper mills, animal feeds, pharmaceuticals, toothpaste. Marble has dimension stone applications (see above)
FOCUS MINERAL: Salt	
Grade1-human consumption (table salt); Grade2-animal consumption; Grade 3-Rock salt (food softening, salt licks for animals)	Iodized table salt, potassium chloride and sodium bicarbonate. De-icing product, chemicals industry, particularly in the manufacture of chlor-alkalis and plastics. ⁵⁸
FOCUS MINERAL: Gypsum	
Portland cement* for construction (currently not in production)	Building lath and wall board sheathing and plaster (gypsum board/drywall), plaster of paris, oil sweetener and fertilizer filler.
Pozzolan Ash	
Cement*, concrete (can replace Portland cement in some applications). Blocks and slabs used for construction (as dimension stones).	
Phosphates⁵⁹	
No current production. Sukulu Mine currently in development*.	Agricultural fertilizer and nutritional supplements for animals. Phosphate Fertilizers, detergent/pesticides, water treatment, food additions/livestock and poultry feeds. metal surface treatments, steel industry, cement manufacture.

⁵⁷ MEMD (2008)

⁵⁸ United States International Trade Commission, Rock Salt from Canada: Determination of the Commission in Investigation No. 731-TA-239 (Preliminary) under the Tariff Act of 1930, Together with the Information Obtained in the Investigation. U.S. International Trade Commission, 1985.

⁵⁹ Catherine Niwamanya Wabomba (2013). Phosphate Value Addition-A Key To Economic Boost. <http://ucmp.ug/archive.php>

Vermiculite⁶⁰	
Inorganic fertilizers (used in commercial greenhouses for flower production)* ⁶¹	Construction: Acoustic finishes, construction board, air setting binder, passive fire protection, floor and roof screeds, insulating and light-weight concrete, gypsum plasterboard, loosefill loft insulation and sound deadening compound.
	Industrial: Absorbent packing for hazardous goods, brake pads & brake shoes, castables, dispersions, drilling muds, filtration, fireproof safes, fixation of hazardous materials, eurnaces, insulating blocks & shapes, insulation-high and low temperature, molten metal insulation, molded products, nuclear waste disposal, paint, perfume absorbent and sealants.
	Agriculture: animal feeds, anti-caking material, bulking agent, fertilizer carrier, pesticide carrier, soil conditioner and seed encapsulant.
	Horticulture: Blocking mixes, Hydroponics, micro-propagation, potting mixes, root cuttings, seed germination, seedling wedgemix, sowing composts and twin scaling bulbs.
Other Agrominerals	
Agro-lime used in growing sugarcane. Vermiculite used by greenhouses, mainly for flowers/cuttings*.	Used for soil amendments and fertilizers to increase crop yields. ⁶²
Gemstones	
Currently negligible production.	Used for jewellery and other adornments

Notes: * Mineral commodity or product only produced by industrial medium to large scale mining

As presented above, although a number of commodities currently exploited and produced in Uganda are only produced by medium to large-scale companies, findings from this study show that the largest portion of Development Minerals production in Uganda is undertaken at an artisanal or small scale. Many opportunities nevertheless exist for market entry and growth of the ASM Development Minerals sector. Subsequent sections explore what some of the main barriers are for the sector, and how these can be overcome.

Development Minerals Production, Imports and Exports

Production

Uganda's construction industry is growing at 6%/yr⁶³ and, alongside this, demand for a broad range of "building minerals" including sand, clay, limestone, marble, kaolin and sources of stone

⁶⁰ Henson Mambo, 2013. Vermiculite value Addition – Opportunities and Hurdles. <http://ucmp.ug/archive.php>

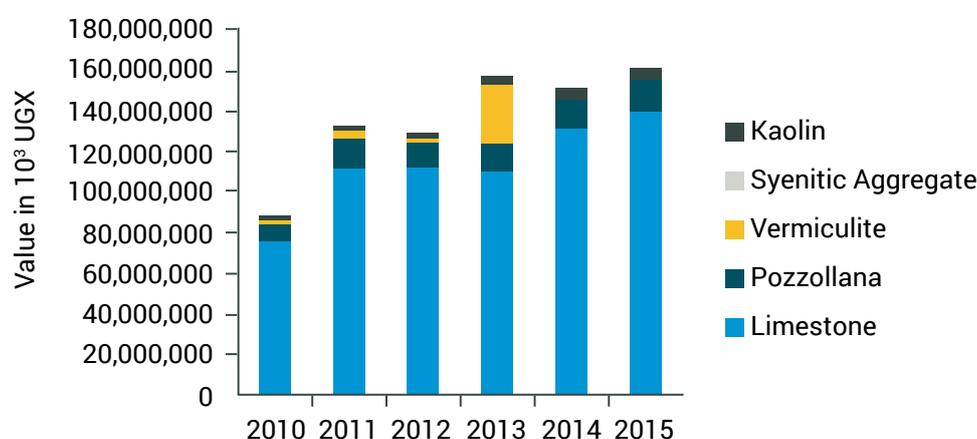
⁶¹ The East African: Black Mountain buys Uganda's vermiculite, April 30 2016. Accessed 9 October 2017. <http://www.theeastafrican.co.ke/business/Black-Mountain-buys-Uganda-vermiculite--/2560-3183702-xa9nvdz/index.html>

⁶² Van Straaten, Peter. Rocks for Crops: Agrominerals of sub-Saharan Africa (2004) Accessed October 9 2017. http://www.worldagroforestry.org/Units/Library/Books/PDFs/11_Rocks_for_crops.pdf

⁶³ Nabisubi, R., 2016, Uganda's Economic Growth Rate at 4.6%, Online at https://www.newvision.co.ug/new_vision/news/1426475/ugandas-economic-growth-rate

aggregate (e.g. quartzite, gneiss, granite)⁶⁴. Notably, between 2013 and 2014, official production of limestone and pozzolanic ash increased by 18.2% and 19.1%, respectively, most of which was used in cement production, while official production of other Development Minerals commodities also generally affirm this trend (Figure 9).⁶⁵ In addition to the purchasing power of the country's burgeoning population, the GoU allocated 31% of its 2016/2017 budget to road and energy infrastructure (including hydroelectric power plants), by far the largest allocation of any sector, and demands on construction materials are expected to increase even further⁶⁶.

Figure 9: Value of Officially Reported Development Minerals Production (2010-15). (Source: DGSM Annual Reports, 2010-15).



Official Development Minerals production statistics, however, are limited to that reported by entities licenced in accordance with the Mining Act (2003) and Regulations (2004), which excludes some of the Development Minerals that are currently exploited (e.g. clay, sand, most but not all stone aggregate and dimension stone production). Furthermore, the majority of entities that produce those minerals currently included in the laws and regulations are medium or large-scale companies, the exceptions being: kaolin, which is produced on a small scale; roughly 10% of pozzolanic ash exploitation; and 24% of limestone/marble production, which is exploited by artisanal miners within a concession held by Tororo Cement Ltd. in the Karamoja Sub-region.

Based on this, and estimates of Development Minerals production in Uganda (Table 6), approximately 98% of ASM and 56% of LSM and MSM Development Minerals production takes place outside of the framework provided under current mining legislation.

⁶⁴ Rupiry, D., (2016). Government Urged to Promote Low Value Minerals. Uganda Radio Network. <http://ugandaradionetwork.com/story/government-urged-to-promote-development-minerals>

⁶⁵ UBOS (2015a)

⁶⁶ Export.gov, 2017, Uganda Country Commercial Guide: The Construction Sector, <https://www.export.gov/article?id=Uganda-Construction>

Table 6: Officially Reported and Estimated Annual Development Minerals Production in Uganda (2015/16).

Commodity	Medium and Large Scale ¹		Artisanal and Small Scale ²		Total	
	Production (tonnes)	Value of Production (USD)	Production (tonnes)	Value of Production (USD)	Value of Production (USD)	Percent Attributed to ASM (%)
Clay Bricks ³	270,407,259	23.2 million	5,137,737,929	266.0 million	289.2 million	95%
Sand	349,100	0.99 million	3,141,390	8.9 million	9.9 million	90%
Stone Aggregate	677,490	6.5 million	6,097,410	58.2 million	64.7 million	90%
Dimension Stones ³	-	-	1,461,119	8.8 million	8.9 million	100%
Limestone	891,295	31.6 million	297,026	11.9 million	43.4 million	27%
Kaolin	-	-	40,774	0.06 million	0.06 million	100%
Salt	-	-	48,927	0.96 million	0.96 million	100%
Pozzolanic Ash	742,423	4.6 million	15,928	0.1 million	4.7 million	2%
Vermiculite	1,213	0.2 million	-	-	0.2 million	0%
Total	-	67,124,001	-	354,913,309	422,037,310	84%

Notes:

- ¹ See Box 2 for explanation of how estimates were derived.
- ² Volume of bricks provided in number of burnt, solid clay bricks rather than tonnes and excludes other brick products (e.g. ventilators, half bricks, face bricks etc).
- ³ Although some entities have been granted rights to exploitation of dimension stones in 2017 (See section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Medium- to Large-Scale Businesses"), as of 2015 production had not been officially declared.

In total, 84% of the value of all Development Minerals production in Uganda is attributed to ASM. The value of ASM Development Minerals production (estimated at roughly 350 million USD in 2015) equates to 5.3 times the value of estimated medium and large-scale production for these minerals and 7.5 times that of their officially reported production. It is also 4.2 times the value of estimated (unofficial) artisanal gold production⁶⁷ and over 7 times the value of *officially reported* production of *all* mineral commodities, including limestone, pozzolana, kaolin, vermiculite, aggregate, gold, tungsten, tantalum, tin and cobalt.

Imports and Exports

The trade deficit from Development Minerals and related products in Uganda amounted to \$82.6 million USD in 2016, constituting 3.2% of Uganda's total trade deficit on -2.56 billion USD (Table 7).

⁶⁷ Barreto et al, 2017.

Table 7: Imports and Exports of Development Minerals and their Products (2016)^{68,69}

Development Minerals Products		Official Imports		Official Exports		Trade Deficit (USD)
		Quantity (tonnes)	Value (USD)	Quantity (tonnes)	Value (USD)	
Clay	Bricks	12,735	1,203,000	51	5,000	-1,198,000
	Ceramics	150,258	36,701,000	1,413	2,524,000	-34,177,000
	Total	162,993	37,904,000	1,464	2,529,000	-35,375,000
Sand		821	187,000	20	3,000	-184,000
Stone Aggregate		4,632	130,000	1,026	248,000	118,000
Dimension Stones	Granite	158	13,000	32	37,000	24,000
	Slate	101	15,000	0	0	-15,000
	Marble	25	21,000	26	2,000	-19,000
	Total	284	49,000	58	39,000	-10,000
Limestone and Related Products	Cement	1,436,316	76,590,000	356,834	61,164,000	-15,426,000
	Lime	16,047	1,693,000	62	10,000	-1,683,000
	Flux	40,005	345,000	1	1,000	-344,000
	Total	1,492,368	78,628,000	356,897	61,175,000	-17,453,000
Kaolin		1,220	519,000	685	104,000	-415,000
Salt		195,315	26,626,000	16,930	3,700,000	-22,926,000
Gypsum		114,040	7,163,000	14	1,000	-7,162,000
Pozzolanic Ash		0	0	0	0	0
Agrominerals	Vermiculite	67	22,000	3,252	876,000	854,000
	Phosphate	392	84,000	0	0	-84,000
	Other	19	15,000	7	14,000	-1,000
	Total	478	121,000	3259	890,000	769,000
Total		1,972,435	151,189,187	380,353	68,688,000	-82,638,000

In terms of contributions to trade deficits, most significant imbalances are associated with ceramics (41% of the Development Minerals related imbalance), salt (27%), and cement (18%). Although lime currently constitutes a trade deficit, its domestic production represents an important opportunity to potentially reduce the deficit attributed to cement.

- *Ceramics*: Although ASM production of ceramics from clay seem to be on the rise, the nature, design, quality and price are more suited to local markets (e.g. charcoal stoves, pots), rather than more “specialized” items (dishware, cookware) that are expected to make up a large proportion of imports.

⁶⁸ ITC Trademap, 2016, http://www.trademap.org/Product_SelCountry_TS.aspx?nvpm=1|800|||25||4|1|1|2|2|1|1|3|1

⁶⁹ Global Edge. Global Insights. Uganda. Accessed 24th November 2017. https://globoledge.msu.edu/Global_Insights/By_Country/Uganda

A number of known kaolin deposits are currently unexploited. Some are of sufficient quality to be used in ceramics and other markets (e.g. paint, pharmaceuticals), and therefore contribute to the reduction of the trade deficit. However, overall production continues to be far less than that required by the cement industry.

- *Salt*: Current salt production amounts to ca. 25% of import volumes, yet Ugandan salt products require further refining to meet standards for iodized table salt. Reportedly, Ugandan investors are examining the potential to establish iodized salt manufacturing at Lake Katwe, by far the largest known source, but due consideration of the sites cultural value (given the 300+ year history of production) and the potential loss of over 10,000 livelihoods (and indeed the economy of the surrounding town of over 25,000 residents) is warranted.
- *Cement*: The large-scale cement industry is looking to almost double in-country production through development of new limestone mines, mainly in the Karamoja Sub-region, and expansion or construction of new cement manufacturing plants. While the need to import key inputs (e.g. kaolin, clinker) likely plays some role, the trade deficit relating to cement is mainly attributed to exceptionally high energy and fuel costs in-country (accounting for approx. 35-40% of production costs)⁷⁰, which substantially weakens the competitiveness of Ugandan products.
- *Lime*: ASM lime producers in Tororo and Kasese have a solid understanding of standards for a range of products but there is a need to: improve access to markets and economically-viable lab testing for certification purposes (See section on “Institutional and Technical Operating Context: Support Services: Organizations and Associations”); reduce variability between the technical capacity of different producers to consistently meet standards; and increase (perhaps through combining the production of several producers) production volumes to fulfil contract requirements. In Muhokya in Kasese District, in particular, lack of attention to product requirements by a few active producers seems to have undermined confidence in all producers in the area, resulting in sharp declines in production since 2008.

Profile of the Development Minerals Private Sector

The Development Minerals sector is made up of an array of different types of businesses, from the smallest, most informal artisanal sites to the largest cement producers in the country. The following section outlines the characteristics and operations of some of these businesses.

Businesses have been divided according to two categories – medium and large-scale businesses, and artisanal and small-scale (ASM) businesses. It is important to note that these classifications have been made in relation to the production rates of organised, unified entities. In terms of total employment, the ASM sector would certainly be classified as ‘large-scale’ (See section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: ASM Employment and Incomes”) and with respect to production, accounts for as much as 11 times of what is currently reported by the formal sector. However, low levels of formalisation in ASM,

⁷⁰ Pettersson, D., 2016, *The Cement Industry in Uganda, Presentation to the Presidential Industrial Roundtable on Minerals Value Addition, Jan. 26, 2016.*

and lack of structured organisation of extraction, processing and commercialisation activities, means that ASM entities as businesses have been classified as artisanal or small-scale in nature. Consequently, officially registered companies with recorded production (either with DGSM of the Ministry of Trade) have been classified as medium to large-scale businesses.

Medium to Large Scale Businesses

According to the 2010/11 Census of Business Establishments (COBE), of the 713 businesses in mining and quarrying, 61% were involved in Development Minerals production, namely the quarrying of stone, sand and clay. These include any kind of “business establishment”, defined as “a single unit ... situated at a single location e.g. an individual firm, mine, factory and undertakes productive activity in which the principal productive activity accounts for most of the value added”. Whilst some Development Minerals ASM sites may fit this definition, it is unclear whether (and unlikely that) they were included in the census. The businesses described in the census, then, have been included in this section of medium to large-scale businesses, and are considered as formal.

As described in the Section on “Profile of the Development Minerals Sector: Development Minerals Production, Imports and Exports: Production”, not all formal businesses extracting Development Minerals are registered according to requirements of the Mining Act (2003) and Regulations (2004). Many companies in the sector are operating under different licenses, such as those granted by the Ministry of Trade, Industry and Cooperatives (MTIC), or in some cases through permissions from local government.

Table 8: Main Medium to Large Scale Development Minerals Producers

Commodity	Licensed companies listed on the Mining Cadastre	Companies operating under other licenses	Main Current Consumers
Clay	-	Uganda Clays Ltd, Lweza clays Ltd, Nkozi clays Ltd and Herm Clays Ltd, Butende Brickworks.	Buildings (bricks, roof tiles, ventilators, face bricks), ceramics, pottery
Sand	-	Registered Trustees of Masaka Diocese; River Katonga Investments Ltd; Seroma Ltd; Parkson Hongkong Investments Ltd. ⁷¹	Buildings (mortar, plaster, concrete), Moulds used in foundries, Sandpaper industry
Stone Aggregate	-	Jomayi Stones and Concrete Products Ltd	Road construction, concrete production.
Dimension Stone	Mining Lease Building Majesties Limited ⁷² Location License Samuel Sehabi, Flux enterprises, Tropical sky mineral Rock Limited, Mugume George) ⁷³	Building Majesties Limited , Jomayi stones and concrete products Ltd, Ms Uganda Marble and Granite Ltd, Granite Homes Ltd and Millennium Marble (2000) Ltd	Buildings/House designs (Counter tops, Tiles), stone monuments

⁷¹ Parliament of the Republic of Uganda (2016). These are the companies that have legal permits for their operations. Other companies were named whose legal status is unclear or illegal, but they have not been included in this list.

Commodity	Licensed companies listed on the Mining Cadastre	Companies operating under other licenses	Main Current Consumers
Marble and Limestone	<p>Mining Lease Tororo Cement Ltd, Moroto Cement Industries (u) Ltd, Hima Cement Ltd⁷⁴</p> <p>Location License Peter Lokwang, Bithaba Foundation investment Ltd, Mathimu Enterprises Ltd, Ndiwa Property consultants Ltd, Sikander Meghani⁷⁵</p>	Tororo Cement Ltd;Hima Cement Ltd ; Kampala Cement Ltd.	Cement industries, Agriculture industry in form of agricultural lime, Road industry in form of aggregate, Glass making industry, Blast furnaces, and sculpture industry.
Kaolin	<p>Location License Optima Mines and Minerals Ltd, Nawata Mines Ltd, Masereka Joachim⁷⁵</p>		Paper industry, Paint and porcelain industry.
Salt			Humans and cattle
Gypsum	No production	No production	Used in manufacture of wallboards, plaster and in Portland cement as a hardening retarder.
Pozzolan Ash	<p>Mining Lease National Cement Co. Ltd, Kampala Cement Co. Ltd, Tororo Cement Ltd, Eastern Mining Ltd⁷⁴</p> <p>Location License Industrial Minerals Ltd, Mystical Rose Ventures, Ryan Mining and construction company (U) Ltd⁷⁵</p>	Tororo cement Ltd, Hima Cement Ltd	Portland Cement industries
Phosphates	<p>Mining Lease Guangzhou Dong Song Energy group Co. Ltd⁷⁴</p>	Guangzhou Dong Song Energy group Co. Ltd	Fertiliser industry/ Agriculture
Vermiculite	<p>Mining Lease Namekara Mining Company Ltd⁷⁴</p>	Namekara Mining Company Ltd	Horticulture, insulation, agriculture and construction

Other key characteristics include the following:

- *Regional Distribution:* The highest proportion of businesses in the mining and quarrying sector (41%) are located in the Western region of the country. Only 1% of registered businesses are located in the Northern region, consistent with the elevated levels of informality observed in the area.⁷⁶

⁷² Companies with a mining lease. Uganda Mining Cadastre Portal" Accessed October 11, 2017. <http://portals.flexicadastre.com/uganda/>.

⁷³ Location licence

⁷⁴ Uganda Mining Cadastre Portal Accessed October 11, 2017. <http://portals.flexicadastre.com/uganda/>

⁷⁵ Location licence

⁷⁶ UBOS (2011) report on the census of business establishments 2010/11. Uganda bureau of statistics, republic of Uganda. Kampala. UG. <http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/2010%20COBE%20Report.pdf>

- *Employment contribution:* In 2010/11, only 2,124 people were reported to being employed in the quarrying of stone, sand and clay. The cement industry employs over 2,300 Ugandans.⁷⁷
- *Gender Participation:* Only 25% of employees in registered businesses in the quarrying of stone, sand and clay are women.

Table 8 presents the main officially registered companies and individuals in Uganda's Development Minerals Sector, differentiated by type of license, as well as detailing the main consumers for each commodity from the industry. Of note, those entities holding a Location Licence, by virtue of the scale to which licences are granted (See section on "Policy, Legal and Institutional Framework"), are more accurately categorized as "small scale".

Artisanal and Small-Scale Mining Businesses

Organisational Structures

The organizational structure of operators engaged in ASM of Development Minerals operations varies between sites and commodities. A detailed review of the organisational structure of each of the selected commodities has been given below, however, some general trends can be distinguished that span across commodities.⁷⁸

Despite important distinctions, in almost all cases there are four main stakeholders who are involved in the extraction of the minerals: landowners, site owners, team leaders (who may also be site owners) and mineworkers. Whilst only a proportion of sites described themselves as officially 'organised', for example under an association, all sites display some level of organisation of labour. Organisation of labour varies between sites, with cases of stakeholders working both individually and in teams in all commodities.

Commonly encountered characteristics include:

- The landowner owns the land, and gives permission, either formal or informal, for the miners to work on the land in return for payment. Although the amount, regularity and nature of this payment differs across commodities and sites, this is most commonly in the form of a "royalty" on production (e.g. fee per truckload). The landowner often has an appointed individual to oversee production (e.g. count trucks) and collect payments.
- The site owner is normally the one who receives permission from and deals directly with the landowner, and manages any payment to them and team leaders who distribute funds to workers.
- In some cases, mineworkers work individually and deal directly with the landowner or middle man who represents the landowner. In other cases, mine workers are employed by team leaders or other mine workers to do certain jobs.

⁷⁷ Pederson, D., 2016, The Cement Industry of Uganda, Presentation to the Technical Working Group of the Presidential Industrial Roundtable on Minerals Value Addition, Jan. 26, 2016.

⁷⁸ Please note that whenever the term 'ASM' is used in this section, it refers to Development Minerals ASM.

- Almost all ASM sites are also points of sale. With some variation from one commodity to another, traders generally come to the site in their own (or rented) lorries, and product bought at the site is either used directly by the first-tier buyer, or sold on in another trading centre.

Whilst these trends are generally clear, the informality of the sector lends itself to fluidity of roles; in some cases, the landowner may also work as a team leader for some or all of the year, or a team leader may also sometimes be employed by other miners. For commodities that are more formalised, such as kaolin and limestone, there may be additional stakeholders involved, such as site managers, supervisors, machine operators and established on-site traders.

Levels of formalisation among sites and commodities vary hugely, a situation compounded by confusion among many stakeholders as to what having a 'license' constituted. In most cases, although stakeholders interviewed reported that the landowner had a license to mine, this license may be of an informal nature. In order to mitigate this data limitation and avoid ambiguities, the language of 'reported licenses' has been used.

Understanding the organization of labour and distribution of power therein is critical to understanding the (gender) distribution of benefits, including revenues, access to areas and different jobs and, in the case of outside support, access to training, financing, markets and other information. Similarly, the organizational structure also determines the distribution of risks and negative impacts, for instance, by determining how and to whom new taxes and fees are distributed or who is most likely to lose jobs through mechanization. Factors such as gender, socio-economic status, origin, clan or family affiliation and age, among others, seem to play a role (See sections on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: ASM Employment and Incomes; Workforce Composition"), including in determining the capacity of different individuals to seek recourse in the event of unjust acts (e.g. non- or under-payment by a trader, exorbitant rents or production shares charged by landowners).

For each commodity below, the organisational structure has been described according to the following criteria: (i) main stakeholders present at sites; (ii) legal status; (iii) organisation (e.g. associations), (iv) labour and teamwork; (v) distribution of revenues; and (vi) links to traders and points of sale

Clay

The main stakeholders involved in the extraction of clay for clay bricks are the landowner, the team leaders or site owners, and the mine workers, though these roles were not necessarily fixed. Of the 13 clay sites where ASM site or rapid assessments were conducted, 46% (6 sites) reported being licensed, and 23% (3) reported not being licensed. The licensed stakeholders included individual landowners, associations and small companies. Site owners ranged between 1 and 40, depending on the site size.

The organisation of labour ranged from formal organisation as part of a registered brick-making SME, to informal, ad hoc labour structures where the organisation of labour differed from day to day. 23% (3) of the sites reported as being formally organised – two of these were brick making associations and one was a small-scale enterprise. The most formal arrangement of the sites visited was the SME, where workers were employed, had set roles, and were paid according to a wage-based agreement. Sites organised under associations operated in a similar way, with workers paying a fee to be part of the association, then being paid flat rates according to individual production. The rest (77%) of the sites were only very informally organised. At these sites, some

miners worked individually and others worked in informal teams, although most worked both individually and in teams, depending on the job at hand. Some had set up informal committees with a leader, whilst some miners reported working together with other miners only when combining production to fill a truck, or when help was requested, for example.

The production process of clay has the following steps: digging, moulding, stacking to dry (ground and stacks), kiln construction, firing, loading into trucks. When working in teams, the average team size for digging was 3 people, for moulding 4 people, for stacking 4 people, for kiln construction 9 people, for firing 3 people, and for loading onto trucks 7 people. From the most formal to the most informal sites, all actors performed all the jobs along the process of production, the exception being kiln construction, firing and loading, from which women miners were almost totally excluded but which were generally the highest paid tasks on site (Section on “Environmental, Occupational and Social Impact Analysis: Gender Dimensions of Development Minerals Production”).

Distribution of revenues varied from site to site. In general, at the more formal sites, workers were more likely to be paid on a wage-based basis with different rates for specific tasks. At the more informal sites, workers tended to be paid according to individual production for different tasks (e.g. stacking 1,000 bricks). Some miners produced and sold their own bricks (combining with others for the purposes of firing), whilst some worked on certain steps of the production and employed others to carry out the other steps. At one site, for example, an interview with a woman ‘supervisor’ revealed that, at that particular site, women were more likely to hold the role of supervisor because it was not socially acceptable for them to perform hard labour. The solution was to employ men to perform the steps in the process which were considered to be hard labour (e.g. digging, kiln construction), and perform the other steps (e.g. moulding, stacking) themselves.

Almost all the clay sites visited were also points of sale. Traders generally bring their own (or rented) lorries to the sites, where bricks tend to be sold either by the landowner, if they are involved in the brick-making process, or the team leader, who will then pay any workers with the proceeds, normally according to individual production (per 1000 bricks produced, for example). In some teams, proceeds are split according to how much revenue was collected by the sale of the bricks, as opposed to by individual production per worker.

Sand

The main stakeholders at ASM sand sites are the landowners, the team leaders or site owners, and the mine workers although, as with other commodities, these roles are fluid and stakeholders can occupy one or more roles at different times. All of the 9 sites assessed reported to having a license to mine, although only 22% (2 sites) cited the name of a body who granted that license (one by the Buganda Land Board and one by NEMA).

At 89% (8 sites) of the sites, there was only a very informal organisation of labour in place, if any. Some elected informal committees and site leaders. Of those who worked in teams, the



Figure 10: A sand miner holding a sample in Kasese.
Photo credit: Levin Sources

average size tended to range between 2 and 4 people, the size of which seemed to be determined by the practical requirements of the work rather than the number of workers on site. The production process involves two main steps: digging and loading onto trucks, typically performed interchangeably by team members.

In general, the product was sold by the small teams, and revenue distributed among the members equally. In some cases, the product was sold by the 'team leader', and the workers paid as employees per individual production.

Almost all sand sites visited are also points of sale. Traders generally bring their own (or rented) lorries to the sites, where sand is normally sold by truck load. The sand may be used directly by the first-tier buyer, or may be taken to an urban centre point of sale and sold to other consumers.

Stone aggregate

Main stakeholders typically include the landowners, the team leaders or site owners, and the mine workers. At 77% (10) of the 13 stone aggregate sites assessed, it was reported that one or more individual landowners had a license to mine in that area, although, as mentioned above, it was not always clear as to the formal nature of these licenses. Only 23% (3 sites) were run by registered associations, who reported to having a license to mine, or to be working on land owned by individuals who had a license to mine.

The organisation of labour tended to be informal, but ranged from the site being run by an association who employed workers, to ad hoc labour structures where the organisation of labour changed from day to day. The most formal arrangement was in one of the sites run by an association, where the association employed workers to dig and crush stone aggregate using the revenues collected from the sale of the product. At this site, 800 of 1000 total workers worked in teams of, on average, 25 people, however this was exceptional.

At most other sites, there were two categories of workers – those who rented their own small piece of land from the landowner and sold any aggregate produced there, employing others as necessary, and those who were employed by other workers to do specific jobs, such as digging, crushing or sieving. At most of the sites (62%, 8 sites), some workers reported working in informal teams, of which the average size was 3 people. Women were more likely to work in groups than men. Most sites described team structures as fluid, with certain miners or team leaders employing others depending on the number and tasks required for a given day (e.g. in response to

orders for a certain quantity or financial capacity of site owners or team leaders to pay workers).

The production process generally includes digging (rock breaking and extraction), hauling (sometimes by diggers), crushing, sieving and loading onto trucks. Men were seen taking part in every step of the production process, whilst women were generally excluded from digging and loading onto trucks.

Distribution of revenues varied from site to site. Two clear patterns emerged,



Figure 11: Women miners crushing aggregate at a stone quarry in Kabale. Photo credit: Levin Sources

according to whether the workers were able to rent their own piece of land from the landowner, or whether they were employed by others. In the former category, revenues were collected upon sale of the product, at which point the workers were paid off and the 'leader' left with the rest. In the latter category, workers were paid according to individual production. Where women rented their own piece of land from the landowner, they generally paid men to do the heavier labour such as digging and loading trucks.

Almost all the stone aggregate sites visited were also points of sale. Traders generally bring their own (or rented) lorries to the sites, where stone aggregate is normally sold by the truck load. The aggregate may be used directly by the first-tier buyer, or may be taken to an urban centre point of sale and sold on.

Dimension Stones

Of the 13 stone sites assessed by the research team, 7 produced only aggregate, and 6 produced both aggregate and dimension stones. No sites assessed produced only dimension stones, although, as described in the Section on "Profile of the Development Minerals Sector: Range, Geographic Distribution and Markets of Development Minerals: Diversity and Distribution of Minerals Occurrences and Deposits", some minor production of stones not suited for aggregate (e.g. mudstone/siltstone or pozzolanic ash) occurs in country. Factors that seemed to influence the production of dimension stones were the availability of rock that can be easily separated into dimension stones (e.g. foliated, layered), and market demand. Despite often higher sale price per tonne of dimension stones than aggregate than hardcore (with only slight increases in related labour demands), the market for these stones is typically lower and less consistent than for aggregate.

There were no patterns or trends in the organisation of labour to distinguish the sites that produced dimension stones, and the sites that did not. Extraction is mainly performed alongside larger stones (hardcore) used for aggregate production, with larger slabs segregated and then reduced slightly in size if warranted.

Lime/Limestone

There are currently two main ASM lime producing areas in Uganda, in Kasese and Tororo Districts. Lime production in both localities is very low and neither operates at maximum production levels. For example, in Muhokya, historically ca. 10 lime production sites were active, employing approximately 300 workers in total (including at quarries) across the area. Currently, only around 5 sites are active, often at 20% or less of their production capacity. The main stakeholders at the sites are landowners and site owners, site managers, mine and lime production plant workers and



Figure 12: Miner pours limestone into kiln. Kasese.
Photo credit: Levin Sources

in some cases supervisors. Limestone quarries typically, although not always, operate separately from the lime production plants, in which case limestone is purchased from quarry site owners.

Both sites reported to holding licenses to mine, under the names of various different landowners. Some were reported to have been granted by MEMD/DGSM, and some by local government. Lime production operates in a more formalized manner than other ASM Development Minerals and the organisation of labour is comparatively well-structured. Mine sites and processing sites tended to be run by a site manager, who employed workers for different roles. Some worked in teams, whilst some worked individually, according to the role that they were performing. For example, diggers always work in teams, whereas other jobs such as filling and emptying kilns and hydrating the quick lime can be done by individuals.

In most cases, different jobs are performed by the same workers, although some jobs are reported to be more specialized, such as hydration of the quick lime to produce hydrated lime. Women are currently excluded from lime production in Kasese but in Tororo, they do work in quarries (typically in crushing).

Lime processing sites are also points of sale. One site sold their product to a major cement company, through a middle man who collected the lime from the processing site in trucks. Many production sites also produce according to a pre-ordered contract (e.g. in Tororo in response to a roadworks stabilization demands) and some bag and sell their own product for different purposes. Agro-lime (overburden containing low concentrations of calcium carbonate) has seen growing demand from sugar companies (given its use in growing sugarcane) also profit margins are limited.

Limestone and marble are also mined by ASM and sold to cement and lime producing companies in the Karamoja Sub-region. Work is often organized into large groups, with individual miners breaking near surface rock and piling for collection and payment by company representatives or (outside of licenced areas) intermediary buyers.

Kaolin

Kaolin production is very low in Uganda, and there is currently only one producing site, run by a small company. The main stakeholders at the site are landowners, company owners and management, site managers and mine workers. The landowners have location licences for the area.

The steps in the kaolin production process include digging, loading onto trucks on site, and loading onto trucks at the nearest trading centre, which is a point of sale to the only middleman sourcing from the area. All workers perform both jobs, and there do not seem to be gender differences in the carrying out of these jobs. The site is organised into several sub-sites, overseen by team or area leaders, where groups of workers are paid per individual production. The average group size is approximately 10 people, although workers do not



Figure 13: A common scene at the kaolin site, Buhweju. Photo credit: Levin Sources

collaborate with each other in the form of teams, rather are paid by the site manager according to how much they produce and tasks undertaken. The exception to this are those who load the kaolin onto trucks at the point of sale, who work in teams of an average of 10 people and distribute the revenues accordingly.

The first points of sale for kaolin are in the vicinity of the kaolin site. The kaolin is transported from the site to the point of sale on trucks owned by the company, where it is deposited in the yard. Traders then bring their own (or rented) lorries to the yard, where the team of loaders load the product onto the truck. The loaders are paid directly by the trader.

Salt^{79,80}

Unlike other commodities, main field assessments focused on the country's largest producer, Lake Katwe salt works in Kasese District. Other salt works occur at Kasenyi in Kasese District and Kibiro in Hoima District and, although much smaller in terms of overall production, are culturally and economically important at a local level.

Although the precise legal status of the extraction appears to be somewhat tenuous at present,⁸¹ activities are extremely well organized, including with approval of and in coordination with the local municipal government. The main stakeholders at Lake Katwe are pan owners, rock salt extractors, mine workers, traders and associations, which generally organize much of the labour.

There are four main associations operating at Lake Katwe. Membership numbers and benefits vary, as below:

- *Katwe Salt Loaders Association*: An all-male association with up to 150 members, although only circa 100 people operate on an average day
- *Katwe Mahonde Extractors; Twinomukye Group*. An association of rock salt extractors. The group has their own Savings and Cooperative Credit Organization (SACCO), and membership has been restricted to 200 men as a management strategy to address the fall in rock salt reserves.
- *Mahonde Women Traders Association*. An association of salt traders, who operate in both rock salt, for which there are 46 traders (87% women, 13% men) and pan salt, for which there are 50 traders (70% men, 30% women)
- *MATA Group: Mahonde Tezike Association*. An association who have their own village savings and loan association that includes both men rock salt extractors and women traders.

⁷⁹ Information has been drawn both from fieldwork (Focus Groups and Rapid POS Assessment conducted at Lake Katwe) and from secondary data.

⁸⁰ Hinton, Jennifer (2011). *Gender Differentiated Impacts and Benefits of Artisanal Mining: Engendering Pathways out of Poverty. A Case Study in Katwe Kabatooro Town Council, Uganda*. University of British Columbia.

⁸¹ ASM salt producers do not hold a "Location Licence" under current mining legislation but reported that efforts had been initiated to obtain one. Reportedly, two Ugandan companies have applied for the exploration rights for the area and, pending their approval, would prevent any other actor (including salt miners associations) from obtaining mineral rights to the area.

The organisation of labour at Lake Katwe is structured in accordance with tasks undertaken. For salt produced from pans, the pan owner will contract other workers to do various jobs ranging from construction of the salt pan, digging irrigation trenches, harvesting the salt and cleaning the pan. The pan owner will conduct some of these activities themselves, and employ workers for other activities. Men dominate construction of pans, whilst women dominate all other production activities in pans.⁸² In this way, workers don't work so much in 'teams' but are employed by other miners, often working in groups to perform tasks which require it. Currently, there are 2,280 active and abandoned pans at Lake Katwe (Figure 14) an estimated 985 owners, approximately 40% of whom are women, with each pan owner holding, on average, 2.3 pans.

Rock salt extraction is normally conducted in teams of two men. The number of rock salt extractors granted is limited to 200, who are only allowed to work two days per week in order to ensure sustainable extraction of the resource. Packing, hauling and loading is conducted by teams of men who are hired as service providers by the miner/owner of the salt.

Lake Katwe is also a major point of sale for salt. Both men and women sell salt from the Lake to a variety of different buyers, including tourists visiting Queen Elizabeth National Park, and dealers, about 50 of whom are granted licenses by the Town Council and buy salt in large quantities.⁸³ Miners also supplement their earnings by buying small quantities of salt from the salt pans and selling them onto the larger dealers.⁸⁴

Figure 14: An estimate 2,280 active and abandoned salt pans can be found in Lake Katwe, covering a 0.96km² area within the 2.7 km² area of the lake. (Image Source: Google Earth, 2017; No. of pans based on image count by G. Naulo).



ASM Employment and Incomes

Employment

In 2008, approx. 2,000 people were reportedly employed in exploration and industrial mining, most of which was attributed to production of cement and related mineral inputs⁸⁵. In the same year, ASM

⁸² Hinton (2011)

⁸³ Hinton (2011)

⁸⁴ Hinton (2011)

⁸⁵ MEMD, (2009a).

production of Development Minerals was estimated to directly employ approximately 180,000 Ugandans⁸⁶. Over half of these workers were women due mainly to high levels of participation in stone aggregate production. Since then, other studies have shown a significant increase in the numbers of ASM miners in the Development Minerals sector,⁸⁷ with some estimates suggesting employment could be as high as 1 million Ugandans.⁸⁸ Such high levels of employment are not infeasible, particularly given that 2016 research suggests that clay and brick production in Uganda may employ over 92,000, more than double than 2008 estimates.⁸⁹

This study's assessment of 42 ASM sites has yielded updated employment estimates by combining site and individual production capacity with national statistics of consumption of ASM products (Box 2). Employment and income estimates are presented in Table 9.

Table 9: Estimated Direct Employment and Incomes in ASM Development Minerals Production in Uganda (2017)^{1,2}.

Commodity	Direct Employment (2017)			Mineworkers Incomes (2017) ³		
	Men	Women	Total	Men (USD/a)	Women (USD/a)	Total (USD/a)
Clay Bricks	156,315	39,467	197,782	299	182	275
Sand	2,236	314	2,550	585	585	585
Stone Aggregate	50,126	118,623	168,750	389	335	351
Dimension Stones	27,058	3,006	30,064	178	89	170
Limestone	4,455	4,000	8,455	347	383	347
Kaolin	70	10	80	356	91	312
Salt	2,836	7,755	10,591	152	102	112
Pozzolanic Ash	265	0	265	242	0	242
Total	219,010	170,470	389,479	319	221	299

Notes:

- ¹ See Box 2 for explanation of how estimates were derived.
- ² Total Employment accounts for dual roles for sites where both dimension stones and stone aggregates are produced (i.e. mineworkers are only counted once, the exception being that 10% of ASM dimension stones sites were assumed to only produce dimension stones).
- ³ Please note that the mineworkers' incomes presented here are only those earned directly from mining. Given the high levels of reliance on supplementary incomes from other livelihoods amongst the ASM population in Uganda, actual total income per capita may be much higher. See Section on Livelihoods Diversification for more information.

⁸⁶ MEMD, (2009a).

⁸⁷ ACEMP (2017). Location and Nature of ASM Activities in Uganda, accessed online 23 June 2017, <https://www.acemp.org/>

⁸⁸ Rupiry, D., 2016. It is possible that this statistic refers to the number of direct, induced (i.e jobs created) and indirect (i.e. dependent) beneficiaries of ASM. Refinement of production, economic and employment statistics in the research should provide clarity.

⁸⁹ Derived from a 2017 DFID-supported study pending approved prior to dissemination.

The main observations from the research are:

- Estimated employment has increased by 115% since 2008 estimates were compiled using similar but improved extrapolation methods⁹⁰. Employment rates per operation are substantially higher in ASM compared to larger business entities, the latter of which employs on average 4 people per entity, far less than ASM sites, where workforces per site can range from ca. 20 to over 1,000.
- Growth is most pronounced in clay brick employment, which generally shows correspondence with brick clay index price increases (203%) between 2008/9 and 2015/16.⁹¹ Estimates of employment of women and men in marble and limestone in the Karamoja Sub-region have also increased by over 250% since 2010⁹², although this may partially be attributed to improved statistics.
- The ASM workforce has also increased substantially at Lake Katwe, reportedly in response to an influx of job seekers to the area over past decade. In the early 1960's, the mining workforce accounted for only about 80 salt miners, growing to about 7,200 in 2006 (ranging between about 4,000 in the rainy season and 12,000 in the dry season)⁹³. Current average annual employment stands at an estimated 10,600 salt miners, an increase of almost 50% within the past decade. Notably, this represents average year-round employment and the workforce is estimated to fluctuate by +/- 30-50% in the rainy and dry seasons.
- Women's employment rate ranges from 0% in pozzolanic ash to 70 and 73% in stone aggregate and salt production, respectively, well above the 25% reported by formal entities (See section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Medium- to Large-Scale Businesses").
- On average, however, women constitute only 44% of the ASM Development Minerals workforce, mainly due to comparable low levels of employment in clay brick production (20%). Women were found to well exceed men's participation in ASM in many areas, particularly in stone quarries, in Eastern and Northern Uganda. Discounting the clay sub-sector, women's employment would have averaged 61% across all other commodities.
- Reasons for women's varying levels of employment in different commodities and regions are examined further in Section 6.5.

⁹⁰ MEMD, (2009a).

⁹¹ In Barreto et al (2017), P. Schein corrected the change in construction GDP ifrom fiscal year 2008/2009 to 2015/2016 (342%) with the burnt clay index price increase (+68%) for the same period), the construction GDP increased by 203%.

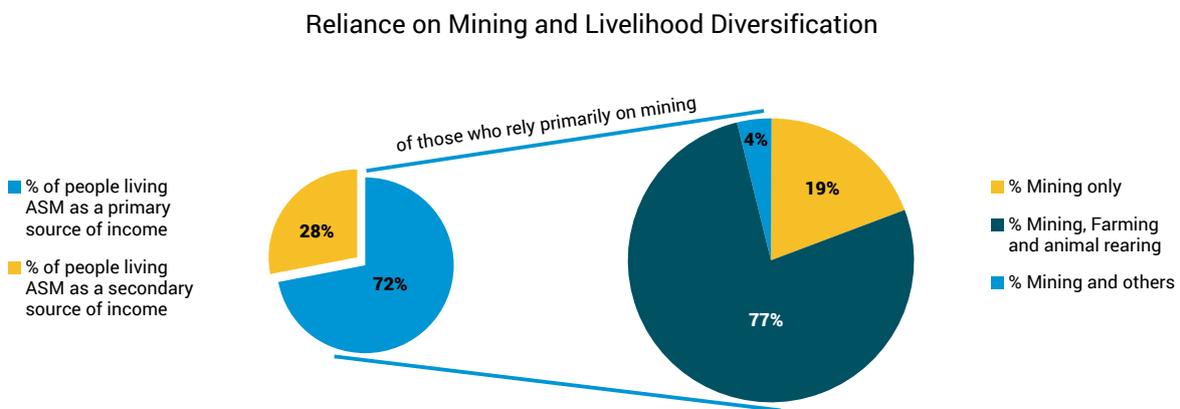
⁹² Hinton et al. (2011)

⁹³ J. Hinton, F Kyakonye, J. Okedi. et al, (2006). Baseline Profile of Artisanal and Small Scale Mining Livelihoods in Kasese District: Salt Mining in Katwe-Kabatooro Town Council and Limestone Mining and Lime Production in Muhokya Sub County, Unpublished Report to Ministry of Energy and Mineral Development, Entebbe Uganda, 203p

Livelihood Diversification

Levels of dependency on the Development Minerals sector differ regionally and by commodity, and sometimes even within mine sites, depending on the individual contexts of ASM miners. The primary data from this study showed that, whilst mining is the primary source of income for around 70% of miners, it is the sole source of income for only 19%. Given income levels cited in Section 3.4.3, it is not surprising that 77% have joint income from mining and agriculture and/or animal rearing, and a further 4% have a joint income from mining and non-agricultural activities.

Figure 15: Rates of livelihood diversification. Source: Field data



There are several factors that influence levels of livelihood diversification in the Development Minerals sector in Uganda. Seasonality is the most common reason for seeking alternative livelihoods to supplement miners' primary source of income. In the rainy season, many sites see as much as a 50% reduction in workforce due to the difficulties of extracting ore from flooded pits, working in uncovered areas and transporting minerals on unpaved roads. The rainy season also coincides with a fall in demand due to the decrease in rates of building during that time. The seasonality of farming is also a factor, with many miners choosing to work at the mine site when there is least agricultural work to do.

Necessity is another reason for diversification. Many people turn to ASM as a supplementary income to alternative activities while other miners turn to alternative livelihoods when income from mining is insufficient for their household needs. The trends and impacts of livelihood diversification in the Development Minerals sector are discussed in more detail in the Section on Social and Economic Impacts and Management Measures.

Incomes

Mine workers' incomes (excluding mine owners and landowners) directly inject almost \$124 million USD into local economies annually. Individual annual incomes from ASM are roughly half of the gross national income (GNI) per person (\$660 USD/p/a). This is attributed to two main factors. First, sharp declines in employment and production in the rainy season reduce contributions to total annual income. Second, the revenue share of sales which accrues to pit owners, site owners and landowners is significant, as described further below.

However, an analysis of the incomes of the ASM Development Minerals workforce must take into account incomes from other livelihoods available to miners, such as farming, and the high levels of livelihood diversification present in the workforce, as presented in the above section.

Data that allows a direct comparison of miners incomes with farmers' incomes is scarce. Few recent assessments have effectively determined the income of farmers, despite the fact that the agriculture employs 72% of Uganda's workforce⁹⁴. In 2012, Ugandan farmers earned 289,645 UGX per annum (approximately \$100.3 USD based on Bank of Uganda rates for that year). Comprehensive surveys by CGAP (2016) suggest incomes range widely, with 26% of smallholder farming households (not individuals) earning below \$1.25 per day in farming activities and 70% earning less than \$2.50 per day, although number of days worked resulting in incomes are unclear.

In terms of livelihood diversification, primary findings showed that, in addition to incomes from ASM, 77% of Development Minerals miners also rely on farming and livestock rearing, while 4% rely on other economic activities (e.g. small trading). Importantly, miners' incomes reported in Table 9 exclude the contribution of other economic activities into which miners report often investing their incomes. Of those who solely rely on ASM (about 19% of miners), incomes are on average 3.2 times that of those derived from those who engage in smallholder farming alone. The ratio of miners' incomes to those from farming range widely between commodities, the lowest being salt miners (1.5), alluding to their vulnerability, many of whom are economic migrants, and highest for sand miners (5.8).

For miners who undertake mining and farming throughout the year alongside mining, incomes are estimated to be 4.1 and 3.1 times higher for women and men miners, respectively, than for smallholder farmers.⁹⁵ For these miners, incomes average across the commodities from \$402/year for men and \$353/year for women miners.

For miners who are only engaged in ASM for half of the year (and assuming 4-6 days per month are spent to maintain their farms), incomes are estimated to be 4.2 and 3.7 times higher for women and men miners, respectively, than for smallholder farmers. For these miners, incomes average across the commodities from \$418/year for men and \$369/year for women miners.

This analysis corresponds to the observed and described higher ratio of men involved in ASM during the rainy season compared to women. Even with comparatively lower productivity in rainy seasons, men who continue to engage in ASM throughout the year make more money than those that stop mining for months of the year. Because women's incomes are generally lower (primarily due to the gender division of labour), farming for periods of the year provide more lucrative returns, while enabling them to maintain socio-cultural expectations, including those related to household food security.

The incomes of miners are more accurately represented by data that accounts for the supplementary income that they receive from agriculture as shown in Figure 16⁹⁶.

Furthermore, these results are consistent with those of the World Bank Group (2016) and UNDP (2014)⁹⁷, that suggest that the GNI per capita is skewed by growth of the upper middle and upper class and does not effectively capture the real incomes of the majority of the working population. Although miners incomes appear to be low, these results clearly reaffirm that ASM is far more

⁹⁴ The World Bank Group (2016). The Uganda Poverty Assessment Report 2016.

⁹⁵ These estimates are based on CGAP incomes averaging \$1.8 per day and assuming 4-6 days per month for six months of the year and, for remaining months, 50% of time spent on farming in the remaining six months. Source: CGAP (2016). National Survey and Segmentation of Smallholder Households in Uganda.

⁹⁶ Farming only incomes taken from World Bank (2016).

⁹⁷ UNDP (2014). Poverty Status Report 2014: Structural Change and Poverty Reduction in Uganda

lucrative than small holder farming and is therefore logical choice that can provide stepping stone for those engaged in the sector (including through reinvestment in agricultural and non-agricultural livelihoods).

Other key observations include the following:

- Women's earnings from ASM are, on average, only 69% of the earnings of men. This is largely attributed to the gender division of labour. For most sites and commodities, jobs and tasks performed predominantly by women are valued at lower rates than those tasks that are dominated by men.
- Incomes from sand mining are highest, in large part due to high individual daily production capacity and consistent demand for products. Incomes in stone aggregate and salt production are lowest, given that average incomes account for lowest paying jobs that require large workforce numbers (e.g. crushing and hauling or salt pan harvesting and cleaning, respectively), most of which are performed by women.
- Daily incomes account for annual averages (e.g. days where no income is obtained due to days off or rainy season declines) and actually can be much higher, in some cases \$3-10 per day depending on the task or peak sales. Highest paying jobs (e.g. loading trucks with bricks, which can yield \$3 per person per truck) and which are generally not done by women, are interspersed with lower paid or unpaid labour (e.g. hauling bricks or stone for a mineworker's own purpose). Breakdowns of time spent on different tasks have been integrated in overall averages.
- Income shares of landowners and site owners are excluded from average incomes above, but constitute a large proportion of ASM revenues, averaging 48%, which are distributed a much smaller group of individuals. Revenue sharing proportions vary from site to site. For instance, in one clay mine, pit owners pay a monthly rent of ca. \$9 USD to one of 40 landowners of the area where they are working, amounting to about \$4,200 USD per annum accruing to land owners. In another case, in the absence of a landowner, clay mineworkers deduct from their revenues a "tax" to the National Forest Authority (NFA) in the amount of \$5-9 USD per kiln (depending on its size), amounting to almost \$14,000 USD per annum.

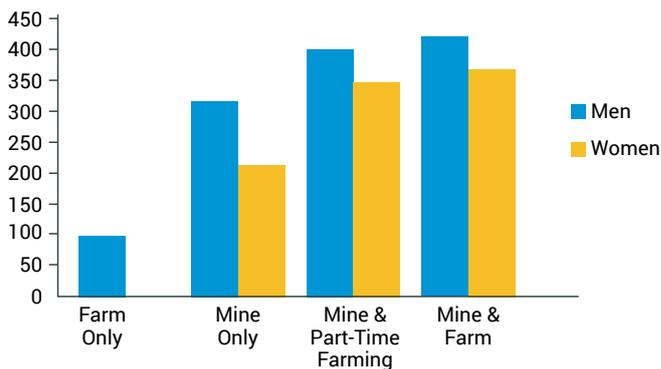


Figure 16: Estimated incomes of ASM workforce including supplementary incomes (Source: World Bank (2016) and primary data from this study)

Workforce Composition

Gender

Gender balances in the Development Minerals workforce in Uganda varied hugely by mineral (Table 10). Data collected showed that whilst men were in the majority at sand, clay, limestone, kaolin and pozzolana quarries, higher proportions of women are working in stone quarries and the salt mines. The dimension stone sector is also heavily male dominated, despite the fact that

the majority of dimension stones are produced in stone aggregate quarries, as the digging of dimension stones is normally considered a man's job.

Table 10: Estimated Workforce Composition by Gender and Commodity⁹⁸

	Total	Men (%)	Women (%)
Clay Bricks	197,782	80%	20%
Sand	2,550	88%	12%
Stone Aggregate	168,750	30%	70%
Dimension Stones	30,064	90%	10%
Limestone	8,455	53%	47%
Kaolin	80	88%	13%
Salt	10,591	27%	73%
Pozzolanic Ash	265	100%	0%
Total	389,479	56%	44%

Women's participation was, in general, much higher in Northern Uganda than in the other regions. This may in part be due to higher levels of poverty and unemployment (formal employment), factors that drive stakeholders towards the ASM sector as the only viable livelihood option.

For some commodities, for example salt, the gender balance has largely not changed over the last decade, where, in 2006, it was estimated that 70% of the workforce at Lake Katwe were women. In others, however, changes in the demographic are clear over time. A 2006 study of the stone quarries in Mukono found 62% of the workers to be men and only 38% women. This study found that 60% of respondents from Mukono were women, and only 40% men. National findings put the percentage of women in the stone aggregate workforce as a whole even higher at 70%, in large part due to high participation rates in the north.

Women and men do not tend to perform the same activities – rather each commodity has tasks that are clearly defined as for men, while others can be performed by either women or men (but are often dominated by women). Whilst the distribution of these tasks is not set in stone, the vast majority of sites adhere to them. In stone quarries, men dig boulders out of the rock that are transported (commonly but not always by men) to the crushing areas. Here women, and sometimes also men, use hammers or rocks to crush the large boulders into various grades of aggregate. If necessary, both women and men will sieve the aggregate to separate it from the stone dust. The men are responsible for loading the aggregates into trucks for sale. In the salt sector, women are mostly employed to work in pans, although a small percentage of women own their own pans and employ others to work them. They are also involved in selling the salt. Women do not participate in the extraction of rock salt. At clay sites, women perform most of the same jobs as men with the exceptions of digging clay, operating the kilns and loading trucks. The limestone sites showed the most stringent gender-related restrictions, where respondents stated that it was not safe for women to work on site because of the corrosive nature of quick lime, and that traditional women's clothing was not protective enough for it to be safe.

⁹⁸ These gender statistics were calculated from the field data.

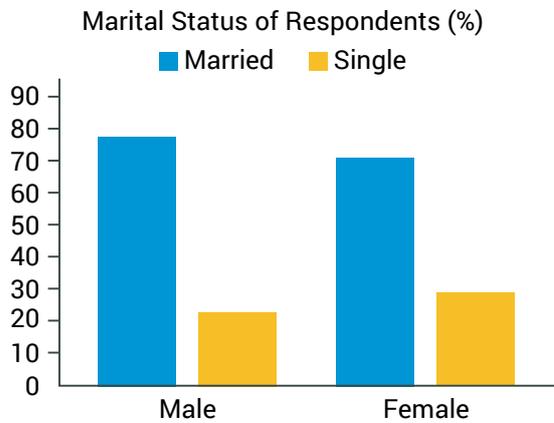


Figure 17 compares the marital status of men and women participants across all commodities.

Marital Status

Most of the respondents interviewed were married, and the Development Minerals sector was a way for them to provide for their families. There were slightly more single women than single men working in the sector as a whole.

Age

The workforce at almost all mines assessed during the field work was composed of a variety of ages and genders, with the exception of both limestone sites (Tororo and Muhokya S/C) and the pozzolana site in Kabarole district, where all respondents were male. Age and gender distribution, however, differed from one commodity to another. Given the wide scope of the project, statistical data on ages, and particularly the participation of children, was not captured. High-level findings nevertheless provide insight.

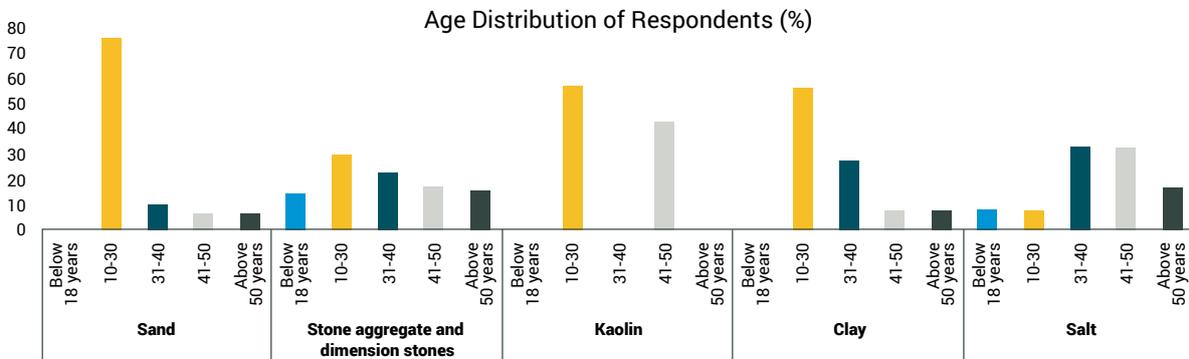
In all commodities, the majority of respondents were aged between 18-30 years old, a majority that was particularly pronounced in sand and clay mining, where 76% and 56% of respondents respectively belonged to that age bracket. Stone aggregate and dimension stone sites displayed the most even distribution of ages, although a 2006 study on stone quarries in Mukono showed a younger workforce than was observed during the fieldwork for this project.⁹⁹ Respondents in stone quarries also exhibited the second highest levels of experience in ASM, with many of the older respondents claiming to have worked on the same site for 15-30 years. The commodity with the oldest workforce was salt, with 66% of respondents aged between 30-50 years old. Salt was also the commodity where respondents had, on average, worked at the site or in the ASM sector for the longest amount of time. It is possible that the long tradition of salt mining at Lake Katwe was an influencing factor in its older and more experienced workforce.

Children

The primary collection of statistical data for ages and status of children at the assessed sites was out of scope for this project. However, the presence of children was observed on sites in all districts and most commodities assessed by the field team, with the exception of limestone¹⁰⁰. From these observations, certain trends emerged in the participation of children in the Development Minerals sector, and are presented below:

⁹⁹ Birabwa, Elizabeth (2006). *Small-Scale Stone Quarrying: Its Contribution to People's Livelihoods*. Norwegian University of Science and Technology. (p.57)

¹⁰⁰ Children were not observed when the research team assess the pozzolana site, although research shows that there have historically been children working in pozzolana sites in the assessed area. (Bread for All, 2017)

Figure 18: Age Distribution per Commodity

The presence of children at the Development Minerals sites assessed can be broken down into 5 main categories:

- Category 1:** Children (perceived to be) under the age of 14 who were present at the mine site, but were accompanying a family member and were not working
- Category 2:** Children (perceived to be) under the age of 14 who were performing certain jobs at the mine site, but whose work would not be deemed as harmful or hazardous
- Category 3:** Children (perceived to be) under the age of 14 who were performing the same jobs as the adults at the mine site, which could be deemed as hazardous work
- Category 4:** Children (perceived to be) between the ages of 14-17 who were performing certain jobs at the mine site, but whose work would not be deemed as harmful or hazardous
- Category 5:** Children (perceived to be) between the ages of 14-17 who were performing the same jobs as the adults at the mine site, which could be deemed as hazardous work

In terms of distribution, the vast majority of children observed at Development Minerals sites fall into Category 1, wherein children were commonly observed to be near where their parents or guardians were working. Their ages ranged from a few months old to 13 or 14 years, and they were often present in groups of various ages, where older children in the group would play a role in caring for the younger children. A large number of women miners consulted (including those who were tending to infants below school age) indicated that ASM had enabled them to send their children to school.

Out of the two categories where the children's work could be deemed as harmful or hazardous, those in category 5 (aged 14-17) were observed much more commonly than those in category 3.

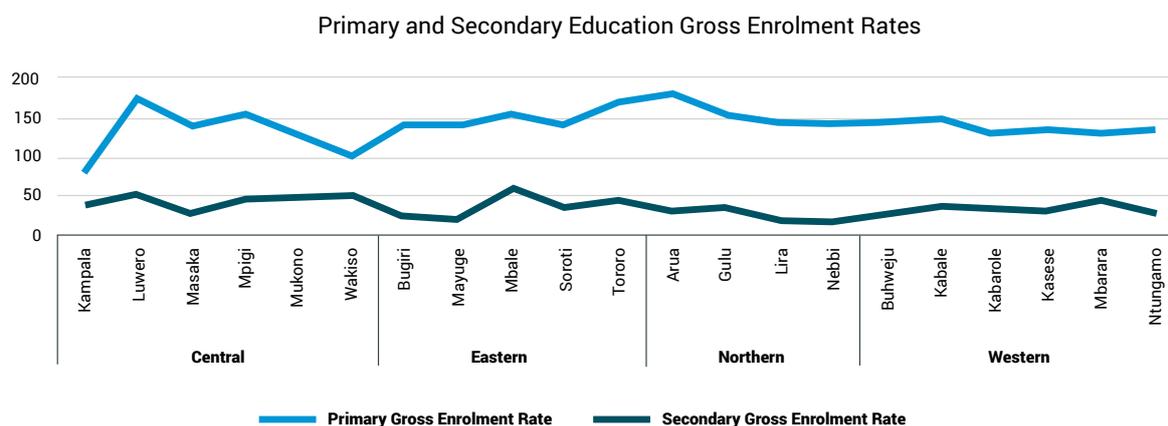
It is likely that most children who fell into categories 2 and 4 were accompanying parents or guardians, and any work performed would be to help the parent or guardian. Whether children fell into categories 2 and 4 was the most difficult to ascertain with accuracy using observation methods, as light tasks are more likely to happen on an ad hoc basis, and so the research team may not have been present at the mine site at a time when the child was working.

Education Levels

Primary school enrolment in Uganda was at 8.7 million children in 2014, with nearly 16% of these (1.4 million) going on to secondary education. The districts with very high population density (e.g. Kampala, Wakiso) tend to have lower school enrolment rates (Figure 17). Literacy, however, does vary by region. The most recent data shows that the highest adult literacy rates in the country are

in Kampala City (95% for men, 92% for women), and the lowest are in the northern region (73% for men, 48% for women) and eastern region (70% for men and 59% for women).¹⁰¹

Figure 19: Primary and Secondary Education Gross Enrolment Rates (UBOS UNHS 2012/13)



Gender parity in 2015 was 1:1 for primary schools, although that figure drops in favour of male students to 0.9 for secondary schools.¹⁰² For a more detailed analysis on the impacts of the Development Minerals sector on education, see the Section on “Environmental, Occupational and Social Impact Analysis: Social and Economic Impacts and Management Measures: Socio-Economic Impacts of Individuals, Households and Communities: Public Services and Infrastructure”.

Origin

The vast majority of respondents lived in and are from the immediate area of the sites on which they worked or in nearby surrounding villages, although in some cases (e.g. sand miners in Masaka), mineworkers came from other parts of the district. Exceptions to this are some stone quarries within Kampala, where women from northern Uganda migrated to the city in search of work. Although some migrant presence has been noted in Development Minerals sites in the past, such as the observed presence of Kenyan and Chinese nationals at sand mines in Lwera in 2016, external migration is not a common phenomenon in the sector.¹⁰³

Key Findings: Profile of the Development Minerals Sector

Uganda is at a critical juncture in its economic transformation. Among a number of development imperatives, the country is experiencing a decline in economic growth rates alongside rapid population growth and commensurate demands on land, health and education systems, housing, other infrastructure and employment. In response to this, the GoU has identified massive infrastructure improvements as one a critical catalyst for industrialization, job creation and robust economic growth.

¹⁰¹ UBOS (2015a)

¹⁰² Ibid.

¹⁰³ Parliament of the Republic of Uganda (2016). Report of the Committee on Natural Resources on Sand Mining in Uganda. Accessed 2nd October 2017. <https://www.scribd.com/document/333728368/Report-of-the-Parliamentary-Committee-on-Natural-Resources-on-sand-mining-in-Uganda#>

Development Minerals are poised to substantially contribute to these endeavours. Key findings from the sector profile allude to both the tremendous economic potential of Development Minerals and main challenges that must be overcome in order to fully realize this potential.

Uganda boasts a diversity of Development Minerals crucial to fulfilment of the nation's development goals. These include a broad range of construction minerals including clay, sand, limestone, marble, kaolin and sources of stone aggregate and dimension stone that are essential to meeting demands of both the rapidly growing population and public infrastructure investments. Among a range of industrial minerals, sectors such as plastics production, pharmaceuticals and oil well drilling all rely on mineral inputs including salt, kaolin and bentonite, respectively. Development Minerals also include agro-mineral inputs such as phosphates, vermiculite and lime, that have potential to spur agricultural production, counter depleting soil fertility and maintain food security.

Despite multiple potential downstream applications, most Development Minerals are transformed into a limited number of products and/or produced in insufficient quantities, with implications for the trade deficit. Reliance on imports of many Development Minerals and their products constituted 3.2% of Uganda's balance of trade of -2.56 billion USD in 2016.¹⁰⁴ The most significant contributors to this are cement, ceramics (inclusive of sanitary ware, dishware and other products that can be derived from kaolin), salt (mainly in the form of iodized table salt) and to some extent lime.

ASM is estimated to produce 84% of all Development Minerals (by value) in the country. Estimated at 350 million USD in 2015, ASM production equates to 5.3 times the value of estimated medium and large-scale production for these minerals and 7.5 times that of their officially reported production. This is also 4.2 times the value of estimated (unofficial) artisanal gold production¹⁰⁵ and over 7 times the value of *officially reported* production of *all* mineral commodities, including limestone, pozzolana, kaolin, vermiculite, aggregate, gold, tungsten, tantalum and tin. Main ASM products by volume, value and employment are solid clay bricks followed by stone aggregate and limestone.

ASM Development Minerals are a major source of rural and peri-urban employment. Extraction of clay bricks, sand, stone aggregate, dimension stone, kaolin, salt and pozzollanic ash is estimated to directly employ about 390,000 Ugandans, with women constituting approximately 44% of the workforce. This marks a 115% increase since 2008 estimates of the sector. Clay, sand and stone aggregate, in particular, are mainly located in close proximity to urban centers and, in light of soaring urbanization rates, are expected to constitute a growing source of much needed employment. Within 150km of Kampala alone, 1238 active and abandoned sites for clay (576), sand (346) and stone aggregate (316) production have been identified.

Despite the high value of ASM production, incomes of the majority of the ASM workforce are low. Individual incomes average ca. \$300 per annum. This is largely attributed to two factors: (i) sharp declines in production and employment in the rainy season; and (ii) the way in which most ASM is organized and financed, resulting in almost half of production value (estimated at 48% on average) accruing to site owners, pit owners, supervisors, land owners and other economic

¹⁰⁴ Global Edge

¹⁰⁵ Barreto et al, (2017).

actors. Among mineworkers, women earn on average approximately 31% less than men, mainly due to the gender division of labour at ASM sites.

Strengthening human capital and ensuring inclusive development seems key to unlocking the employment and wealth creation potential of the sector. Although a number of structural inefficiencies (e.g. high energy costs, access to new markets) impact all economic actors in the sector, a fundamental understanding is needed of the private sector actors responsible for the bulk of Development Minerals production, the ASM workforce. In this respect:

- Although young, single and largely disenfranchised men constitute a major proportion of the ASM workforce in clay and sand mines, on average, the majority of the workforce is married, between the ages of 18-30 years and originate within the area or districts where activities take place.
- If clay brick production is excluded, women's employment share skyrockets to 68%, mainly due to high participation rates in stone quarries, in particular in northern Uganda. Ensuring that women are not left behind through strategies to transform the sector will be crucial to advancing inclusive development and broad-based wealth creation from Development Minerals.
- Young children can be found around mines, mainly due to lack of childcare, as most miners seem to invest earnings sending their kids to school. Nevertheless, across Uganda, only 16% of children continue from primary to secondary school. Child labour rates in mines, particularly for those over the age of 14 years, is a major concern from both a human rights perspective and in terms of the nation's development.
- Roughly 70% of ASM miners also rely on other livelihoods, including in agriculture and trade. This diversification enables investment of ASM revenues in and therefore buttress other sectors while providing a means to supplement low incomes from ASM.
- With relatively low skill levels and financial investment required for entry into ASM, the sector continues to mainly operate at an artisanal level, employing basic and often environmentally damaging and occupationally risky technologies and methods. This both perpetuates the low incomes derived from work in the sector and impedes the capacity of miners to invest in improvements.

Finally, it is estimated that 98% of ASM production and 56% of MSM and LSM production of Development Minerals takes place outside of the current mining sector legal framework. For Uganda to fully capitalize on the tremendous economic potential of Development Minerals, policy, legal and institutional actions must be taken in order to bring this neglected sector from obscurity into the mainstream economy. Transformation of the Development Minerals sector into an engine for national development hinges on formalization of the sector, and ASM in particular, as it would provides an essential vehicle through which services and support can be extended and sectoral performance can be regulated. Opportunities, challenges and strategies for this within the policy, legal and institutional framework are presented in the following section.

Policy, Legal and Institutional Framework

This section gives an overview of the legal and regulatory context within which Development Minerals production takes place in Uganda. It outlines existing policy and legal frameworks and the institutions that govern the sector, providing a rapid legal and regulatory gap analysis and offering ways in which institutional mandates could be clarified in order to better manage the Development Minerals ASM sector. The section also looks forward at the changes made in the draft National Mining and Minerals Policy Uganda (NMMPU), as well as providing insight and lessons learnt from other contexts worldwide.

Introduction to Policy and Legal Context

Upon adoption of a modern minerals policy framework in 2001, Uganda explicitly recognized ASM for its contribution to the economy, livelihood significance and the unique environmental, occupational and social challenges posed by the sub-sector. Among multiple other sectoral strategies, the Minerals Policy (2001) further affirmed a policy mandate for the Department (now Directorate) of the Geological Survey and Mines (DGSM) under the Ministry of Energy and Mineral Development (MEMD) by committing to:

“Regularize and improve artisanal and small scale mining through light-handed application of regulations, provision of information on production and marketing, provision of extension services through miners associations and implementation of awareness campaigns targeting artisanal and small scale miners” (Minerals Policy, 2001).

Since promulgation of the Mining Act (2003) and Regulations (2004), minerals sector stakeholders have had an opportunity to evaluate the strengths and weaknesses of the prevailing framework, including as new challenges and opportunities have emerged with the sector's evolution.

Alongside this, a diverse range of African and international drivers have come to the forefront, among which include the African Mining Vision (AMV), Agenda 2063, a number of efforts to advance regional and continental economic integration (EAC, AIDA, CFTA)¹⁰⁶ and commitments to sustainable development, gender equality and human rights via the 2015 Sustainable Development Goals (SDGs), African Charter on Gender Equality and Human Rights and a range of other regional and international conventions. At a national level, Uganda Vision 2040 has outlined a range of goals, objectives and strategies to advance economic transformation, within which job creation, industrialization including



Figure 20: The current policy recognises the significance of ASM as a legitimate livelihood. Miners loading bricks onto a truck in Wakiso District. Photo credit: ECO Uganda

¹⁰⁶ EAC - East African Community, AIDA – Accelerating Industrial Development for Africa; CFTA – Continental Free Trade Zone.

through in-country value addition to minerals, reduced reliance on imports and massive investment in infrastructure figure prominently.¹⁰⁷

Recognizing the changing context and need for updating of the current policy and legal framework, the GoU has embarked on the process of reforms. Spearheaded by an Inter-Ministerial Task Force, the past 3 years has enabled reviews of practices in other jurisdictions and a number of multi-stakeholder consultative processes have been undertaken over the past 3 years, resulting in verbal and written submissions from civil society, private sector and government, including with participation of the ACP-EU Development Minerals Programme. This has culminated in a draft National Mining and Minerals Policy of Uganda (NMMPU), now in its final phases of review prior to submission to Parliament. Following these requisite approvals of the NMMPU, DGSM officials indicate that efforts are underway to rapidly draft and promulgate a new body of minerals sector law and regulations.

Adequate consideration of ASM Development Minerals within the upcoming minerals sector governance framework is warranted, particularly given their current and prospective economic and livelihood significance in Uganda (preceding Section) and potential to support national development aims.

This section provides a brief analysis of current policy and legislation governing the minerals sector, including with respect to relevant environmental, social, occupational and labour legislation and provides insight into how the draft NMMPU can better respond to specific issues associated with ASM Development Minerals. Specific attention is given to the role of government institutions in the achievement of minerals sector goals and objectives, including challenges and opportunities presented by overlapping and complimentary mandates, respectively (below section on "Development Minerals Policy, Law and Governance in Uganda"). Given that Development Minerals sector governance, particularly with respect to ASM, represents a major gap in the current framework, conclusions and recommendations for Uganda are further informed by drawing insight from other jurisdictions that have been seeking to effectively govern, regulate and support the ASM Development Minerals sector (Section on "Current Policy and Legal Framework"). Resulting lessons for upcoming legislation provide the basis for recommendations.

Development Minerals Policy, Law and Governance in Uganda

This section aims to provide insight into key issues within the current policy and legal and framework and entry points for strengthening and existing opportunities within the draft NMMPU with respect to ASM Development Minerals.

With recognition that "*ASM policies, laws, and regulations are only useful if they are realistic to the way people mine artisanally, if artisanal miners have the capacity to obtain licenses and benefit from them, and if they are enforced*"¹⁰⁸, the analysis considers characteristics of Uganda's ASM Development Minerals sector. This includes, in particular, with respect to the organization of labour, production methods, workforce characteristics and financial capacity (See section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector"), current environmental, occupational and social risks and impacts (See sections on "Environmental,

¹⁰⁷ GoU, (2010), p51.

¹⁰⁸ Hinton and Levin. (2010): Comparative Study: Legal and Fiscal Regimes for Artisanal Diamond Mining. PRADD / USAID.p 28.

Occupational and Social Impact Analysis: Environmental Impacts and Management Measures; Occupational Impacts and Management Measures; Social and Economic Impacts and Management Measures), opportunities with the current operating context (See section on “Institutional and Technical Operating Context”) and gender and human rights dimensions therein.

Current Policy and Legal Framework

Under the 1995 Constitution of Uganda, building minerals such as “*clay, murram, sand and anystone commonly used for building or similar purposes*” were not defined as minerals and therefore constitutionally excluded from the jurisdiction of mining authorities. The justification for this provision related to avoiding undue burdens upon countless mainly rural Ugandans to extract, at a micro-scale, these minerals mainly from on nearby their homesteads, in order to build their own homes and small structures.

As a consequence, however, commercial production of these Development Minerals has been largely excluded from prevailing legislation governing the sector, most importantly the Minerals Policy (2001), Mining Act (2002) and Mining Regulations (2004). As indicated in the Section on “Profile of the Development Minerals Sector”, an estimated 98% of ASM and 55% of MSM and LSM production of these minerals takes place outside of the current mining legal framework.

The GoU has recognized these shortcomings and taken steps to rectify this situation, including through constitutional amendments in 2006 that sought to distinguish extraction to meet personal needs from commercial extraction and beneficiation of these Development Minerals. Despite this, the current minerals sector framework remains in effect. Whilst they are, in practice, governed by most of the above laws and policies, the exclusion of “building minerals” commodities throws confusion onto the administrative specifics of the sector, especially with regards to how ASM Development Minerals should be managed differently to ASM of other minerals, and which entities are ultimately responsible for the management of the sector.

In addition to policy and law specific to the minerals sector, other legislation has potential to impact Uganda’s ASM Development Minerals sector. These are outlined in Box 4.

BOX 4: SECTORAL LAWS AND REGULATIONS¹⁰⁹

Current legislation is comprised of the following main policies and acts:

- The Mineral Policy of Uganda, 2001
- The Mining Act, 2003
- The Mining Regulations, 2004

The following acts also apply to the Development Minerals sector:

- The Local Government Act, 1997, and The Local Government (Amendment) Act, 2015
- The Occupational Health and Safety Act, 2006
- The National Environmental Regulations, 2001
- The National Water Resources Regulations, 1998
- The National Environmental Management Regulations, 2000
- The Employment Act, 2006

Additionally, the following policies also have some applicability to the mining sector:

- The National Gender Policy, 2007
- The National Child Labour Policy, 2006
- The National Action Plan on the Elimination of the Worst Forms of Child Labour, 2012

¹⁰⁹ List adapted from that compiled by Barretto et al, 2017.

ASM Licencing Conditions and requirements

Under the Mining Act (2003) and Regulations (2004), the only two available permits for extraction (and related processing) are the mining lease, for large-scale mining, and a location license, for small-scale mining. Positive and negative characteristics of a Location Licence, the licence for extraction designated for ASM, are highlighted below.

Applicable Minerals

Regulation 28(1) of the Mining Regulations (2004) provides for granting of a location licence¹¹⁰ for *only* precious metals, gemstones, limestone, chalk, salt and brine. Despite this, DGSM has granted location licences for other Development Minerals (e.g. pozzolanic ash, kaolin, dimension stones), mining leases for some stone aggregate quarries and others have applied for rights to extract sand.¹¹¹ This definition nevertheless excludes the most significant commodities in

the sector in terms of employment, production value, related economic contributions and associated environmental and occupational risks.

Licence Categories

Ugandan legislation does not distinguish between ‘artisanal’ and ‘small-scale’ mining, although these different facets of the sector are distinct. Given that ASM in Uganda ranges from up to 1,000 independent or quasi-independent producers operating as “micro-enterprises” across a broad area (e.g. some stone quarries in Northern Uganda) to groups of only 12 workers producing bricks on a seasonal basis to small companies with formal contracts with consumers and some capacity to obtain financing (e.g. kaolin), a distinction in licencing categories is warranted.

Different classifications by scale can additionally: (i) provide a basis for entry for artisanal producers into the formal sector; (ii) recognize the diversity of work and organizational arrangements that already exist (e.g. small enterprises, community-based organizations, small companies); and (iii) and provide an opportunity for operators to “step up” to the next category as their operations improve and financial and technical capacity is built.

Investment Constraints

The location license is applicable to “*prospecting or mining operations, which do not involve expenditure in excess of five hundred currency points [approximately \$4000], or the use of specialised technology*”.¹¹² The law is unclear as to whether this expenditure pertains to capital investment or operating costs, a gap which the GoU is well aware of and will undoubtedly rectify in reforms.

The provision nevertheless requires consideration of how limitations on investment can provide a constraint to those operations that seek to improve productivity, efficiency and invest in additional value activities. In some cases, it may also undermine investment in safer working conditions. For

¹¹⁰ Under the Mining Act and Regulations, a “location licence” is granted for small-scale prospecting and mining operations which do not involve expenditure in excess of five hundred currency points (UGX 10,000,000/=) or the use of specialized technology. Because of the low investment, most small-scale mining operations are best suited for location licenses.

¹¹¹ Presumably, this has been enabled by Statutory Instruments allowing for granting of location licences beyond those specified in the 2004 Regulations. Such changes shall be verified during the course of research.

¹¹² Mining Act 2003

example, a decent sized water pump, a stone cutting machine or small jaw crusher can each easily exceed this criteria. Given that the next “step” in licencing (up to a Mining Lease) requires a full feasibility study, comprehensive and costly exploration, a full environmental impact assessment that, together with other costs can easily exceed \$50-60,000, most Location Licence holders are either confined to manual, low tech operations or forced to operate illegally.

Licence Area

The maximum permissible licence area varies depending on commodity within seven (7) categories under the licence. Categories that apply to ASM Development Minerals and related issues (presuming “building minerals” such as stone, sand and clay were not excluded) include the following:

- *Class II - Precious stone locations other than alluvial.* Sixteen (16) hectares. Although gemstones are not currently extracted in Uganda, the area is small, particularly if the government intends to support “step up” licencing.
- *Class III - Locations for non-precious minerals,* sixteen (16) hectares. This is also too small to meet current Development Minerals needs. For example, the currently exploited kaolin deposit is in excess of 1000km along strike, which, when fully exploited (and accounting for known width of the deposit, roadworks and infrastructure, thus a minimum reasonable width of 500m) coverage of the area would extend beyond 36 hectares. Constraints on this size presumes current producers have no plans for future expansion.
- *Class V - Locations within a river or a swamp and land adjoining such river or swamp,* one thousand five hundred metres (1500m) measured along the middle of the course of the river or swamp and not more than one hundred metres (100m) on each side of the course of the river or swamp. This equates to 30 hectares.
- Although most clay and sand sites are less than 10 hectares in area (based on averages in the Kampala region), a number of sites extend up to 57 and 60 hectares. Most sites are typically wider than 100m (extending up to 300m or across the width of the drainage basin).
- *Class VI - Locations for limestone and chalk,* eight (8) hectares. Given the laterally expansive nature and shallow depth of most limestone deposits, such a limited area does not allow for progressive expansion of activities over time.
- *Class VII - Locations for brine and salt,* thirty-five metres (35m) in length and ten metres (10m) in width. The current area of Lake Katwe is 296m, thus this would equate to over 8,000 location licences across the area. The current system of management (i.e. multiple associations registering and managing different actors in the production and value chain) seems more workable under a single, multi-association committee or body rather than thousands of independent licence holders.

In order to provide the opportunity for expansion of activities over time, current legislation allows for concession holders to apply for any number of additional Location Licences adjacent to each other. In reality, however, particularly when a prospect is observed to be lucrative, other actors are likely to come in and take up adjacent areas, precluding this opportunity and impeding longer-term planning and investment by current operators.

Different designations or categories may be warranted for mineral production that takes place immediately within urban areas (as is the case for a percentage of clay, stone and sand sites) as discussed further below.

Duration

A Location License is valid for 2 years, and is repeatedly renewable for the same period. However, findings from this study show that the majority of Development Minerals sites have existed for over 20 years. Extension of this duration to a longer period (while maintaining the option to renew) seems more appropriate given reality of the sector and the aim to support investment and improvements in ASM operations over time. In order to address risks of inactive licence holders, safeguards for regulators (in the form of compliance requirements and potential mechanisms for cancellation) could be strengthened in the law.

Different considerations may be required for extraction of Development Minerals immediately within urban areas (Figure 20). Any proposals for refinements of licencing categories and related criteria (for both duration and size) should be reviewed with consideration of urban planning processes.

Although projected changes in land use should be considered, such considerations should not be a blanket provision for all clay, stone aggregate and sand sites. Only a portion of these sites are applicable.

Bureaucracy and Cost

Procedures for acquisition of a Location License are relatively complex, requiring a prospecting license, confirmation that the area is free, completion of a 5-10-page Project Brief, endorsement from the district Chief Administrative Officer (CAO), a Bank Payment Advice form (BPAF) from DGSM and payment using the BPAF at Diamond Trust Bank in Kampala.¹¹³

Whilst this procedure is far less onerous than that of a mining lease application, the requirements do not reflect the current capacity of the majority of stakeholders in the Development Minerals sector. The procedures require the ability to write a 5-10 page document in English, financial capital to conduct trips to the District Offices, at least one return trip to Kampala and Entebbe, payment for the permit up front and preparation and gazetting fees when and if the application is approved. With total official, travel and accommodation costs can easily exceed \$350-400 for the process. Furthermore, issuance of



Figure 21: Different provisions may be warranted for Development Minerals extraction taking place in urban areas, particularly given the need to balance demands of multiple land users and related environmental and human health risks. (Image Source: Google Earth, 2017).

¹¹³ J. Hinton. (2012): Uganda Case Study. UNEP. Geneva (CH) Analysis of formalization approaches in the artisanal and small-scale gold mining sector based on experiences in Ecuador, Mongolia, Peru, Tanzania and Uganda. http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/ASGM/Formalization_ARM/Case%20Study%20Uganda%20June%202012.pdf

a BAF is becoming more stringent with respect to also requiring applicants to hold a TIN (tax information number) granted through the Uganda Revenue Authority (URA) and which many ASM entities are unlikely to hold.

Mandatory prospecting Licence

Prior to applying for Location Licence, applicants for a location license must first apply for a Prospecting Licence at a cost of approximately \$80. This process again requires similar steps with respect to travel, visiting different government and financial institutions and, given how ASM deposits are discovered and exploited, seems to create an additional hurdle without any tangible benefit to the artisanal miners or government.

Acceptable Organizational Structures

A Location License can be held by Ugandan individuals, companies that are more than 50% Ugandan-owned, or community-based organisations (CBOs) or associations. A major strength of current legislation (and shortcoming of that in many other jurisdictions) is that it recognizes the diversity of ASM with respect to how activities are organized, managed, financed and operated. Under the above definition, individuals, community-based organisations, associations, cooperatives, small enterprises and companies can all apply for and obtain a Location Licence.

A shortcoming, however, relates to lack of specificity concerning how responsibilities differ for different types of organizations. For example, small companies operate with more traditional labour arrangements (e.g. payment of workers) are the major financial beneficiaries and therefore should have increased accountability, including for the labour, occupational safety and environmental performance of the workforce. In order to avoid elite capture of cooperatives and associations (e.g. by landowners, traders, mine owners and pit owners), requirements and guidelines specifying who is engaged in leadership, how they are elected and who and how members should be engaged – including all facets of the workforce and with special emphasis on women mineworkers who are often regarded as “casual” and therefore not miners – are needed to ensure more equitable participation in decision-making. Related regulations may also provide a mechanism to address inequitable revenue sharing agreements, wherein a large proportion of the production value of ASM Development Minerals seems to be accruing to mine owners, pit owners, supervisors and landowners, with the balance to the majority workforce. A concerted review of common organizational structures (See section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Artisanal to Small-scale Mining Businesses”) should be undertaken prior to prescribing requirements for “cooperative” formation.

It is important to note that, whilst intensive organisational strengthening for ASM miners by GoU is provided for under the Minerals Policy (2001), such activities are rarely included in government workplans and budgets. Lack of organisation in the ASM sector remains a barrier to formalisation. This study found that very few Development Minerals ASM stakeholders are generally organised into such groups, and as such, would not be able to access the proper support to apply for a Location License and formalise, even if they wanted to.

Other Policies, Legislation and Compliance Requirements

Minerals policy and legislation provides an overarching framework for the sector, but in reality, regulation falls under a broad number of sectoral policies, laws and regulations. The main issues relate to the fiscal framework, compliance requirements for occupational safety and health and environmental management and gender and human rights commitments.

The Fiscal Framework

Whilst the Local Government Act allows local governments to raise funds using taxes and royalties, there is a lack of clear guidance from central government on how to raise these funds in a manner that is sensitive to the specifics of the Development Minerals ASM sector and within the legal framework. Taxes and royalties have, in other contexts, placed a disproportionate burden on ASMs, who are often the most vulnerable actors in a supply chain, a situation compounded by large proportions of ASM revenues accruing to landowners and mine owners. This study estimates that up to 48% of ASM revenues accrue to landowners and site owners, and the risks of any taxation being pushed down to the general workforce is high, as has been found in Rwanda where success in legalizing over 80% of ASM tin, tantalum and tungsten production has concurrently resulted in lower incomes at mine site level.

The lack of guidance has meant the Act is inconsistently applied across districts, meaning that the economic and development benefit of ASM is not being achieved to its full potential. Given the high levels of informality of the sector and ineffective revenue capture, current revenue from ASM is almost non-existent. Furthermore, the Mining Policy 2001 does not require a differentiated application of taxes and royalties depending on production or size of activities (e.g. ASM versus LSM) and, despite growing awareness of the reality of ASM, imposes impractical expectations on artisanal miners to travel to distant offices and navigate tax bureaucracies to make payments.

This one size fits all approach in the current fiscal framework is a major barrier to formalisation for those whose production levels are relatively low and who do not earn much income from their work. One comparative analysis of ASM in multiple jurisdictions clearly demonstrated that as costs for legality (fees, taxes, royalties) increase, ASM licencing rates sharply decline.¹¹⁴ In response to this, some ASM experts are advocating for a sliding scale or even a zero-rated royalty, particularly for artisanal miners, in order to increase formalization incentives and recognize the trade-off between meagre royalty returns and the other and far more substantial macro-economic contributions of ASM (e.g. VAT, cash injection into local economies) including those that accrue from lateral and forward linkages across the value chains.¹¹⁵

Also citing ASM's broader micro- and macro-development benefits, other research additionally outlines the predictably high costs and human resource demands of royalty collection by government, particularly given the often dispersed nature of ASM activities and capacities of the workforce¹¹⁶. Tax collection from tens of thousands of ASM sites across a country whose land area exceeds 200,000 km² requires a pragmatic cost-benefit analysis by government. This work emphasizes that royalty and taxation it would be far more practical and financially beneficial to government if collection focused on downstream actors, such as traders, for revenue collection. Royalty and taxation rates should nevertheless be reasonable given the value chain set-up and the very high likelihood that any new costs would be pushed down to mineworkers, reducing their meagre incomes even further.

¹¹⁴ J. Hinton, E. Levin. (2010): *Comparative Study: Legal and Fiscal Regimes for Artisanal Diamond Mining*. PRADD / USAID

¹¹⁵ Barreto et al (2017).

¹¹⁶ Hinton and Levin, (2010)

Environment, Labour and Occupational Safety and Health

The current Mining Act (2003) and Regulations (2004) appropriately recognizes difficulties of most ASM operators in undergoing the complex Environmental Impact Assessment process required for larger companies. Location Licence holders must complete a simple Project Brief to accompany their applications describing in simple terms likely environmental impacts and management measures, include simple commitments for mine closure (e.g. backfilling pits). Only those projects that are deemed to have a significant environmental impact (e.g. due to road construction, use of specialized equipment or chemicals) are triggered for more detailed, costly and bureaucratic process.

Requirements for labour and occupational safety and health are less clear and the lack of ASM specific, separate laws and regulations within the mining sector legislation represents a major gap.¹¹⁷ Theoretically, although not practically, labour conditions in ASM would be regulated by the Occupational Safety and Health in Mines Act of 1964. In reality, more modern legislation such as non-sector specific the Employment Act (2006) and Occupational Safety and Health Act (2006) apply. Some provisions therein are particularly relevant to ASM, including:¹¹⁸

- Employment Act (2006): Section 5 (1) requires that no person shall use or assist any other person in using forced or compulsory labour and Section 32 (1) requires that a child under the age of twelve years shall not be employed in any business, undertaking or workplace.
- Occupational Safety and Health Act (2006), which provides for the prevention and protection of persons at all workplaces from injuries, diseases, death and damage to property. These provisions extend to the self employed and any other persons that may be legitimately present in the workplace who may be exposed to injury or disease.

Other provisions that are relevant in terms of the critical occupational and labour conditions in ASM sites exist but most refer to the responsibilities of an employer for its employees, a situation which is not relevant to most ASM Development Minerals operations (See section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector”). These include allowable number of hours per work week and responsibilities (of employers) to: provide for safety and health measures and a clean, safe and healthy work environment including sanitary conveniences, washing facilities, First Aid and facilities for meals; to protect workers from adverse weather, and to provide safe access to the workplaces and safe work practices. Workers’ Compensation Act (2000) requires compensation to be paid to a worker who has been injured or acquired an occupational disease or has been harmed in any way in the course of his/her work. Sections 5, 6 and 7 provide for compensation for a fatal and for permanent total incapacity is 60 months earnings.

The organizational, socio-economic and technical characteristics of ASM creates a range of unique environmental, occupational and labour risks and impacts as described throughout the section on “Institutional and Technical Operating Context”. When coupled with commonly encountered gaps in financial capacity, technical know-how and general constraints to compliance, it is clear that unrealistic requirements for compliance (particularly under generic legislation) is likely to push

¹¹⁷ Barreto et al (2017)

¹¹⁸ Hinton (2012)

artisanal miners farther from the mainstream. The gap may be further widened as authorities and the general public become more aware of ASM Development Minerals (including through sector promotion and awareness raising campaigns) given that, as found in a number of other countries, exploitation and human rights abuses by authorities which can easily escalate when compliance criteria (including those related to taxation) exceeds the capacity of the workforce. Simplification of requirements, in-line with the current reality of the sector, and inclusion of simple access to justice mechanisms, including through accessible, legislated grievance mechanisms and inclusion of mandates of Mining Police via their community policing and social protection functions would help to mitigate these predictable risks.



Figure 22: ASM poses unique environmental, occupational and labour risks. Masaka. Photo credit: Levin Sources

Fortunately, the GoU plans to rectify this in upcoming reforms, including with respect to specific laws, requirements and guidance related to occupational safety and health (OSH) and environmental management of ASM. Lessons can be drawn from neighbouring Tanzania, where simple ASM regulations are currently being drawn up in consultation with artisanal miners based on what they can do (e.g. backfill pits, install women's and men's pit latrines, follow basic safety rules)¹¹⁹. Mongolia provides good examples of simple

templates in ASM regulations for licencing, OSH and environment, while Liberia had drafted (but not passed) ASM regulations include a simple checklist and require authorities (e.g. Mines Inspectors) to provide "advisory support" in response to any infractions identified¹²⁰.

Such regulations could also provide a basis to address labour issues and gender dimensions therein. This could include guidelines and templates within the regulations, such as simple codes of conduct, procedures and related grievance and justice mechanisms (e.g. requirements and penalties for infractions for incidences of harassment, discrimination and other forms of gender based violence; provisions for maternity leave)¹²¹. Childcare could also be considered in such legislation, however, for this and any provision that seeks to address gender inequalities in ASM, those engaged in drafting of legislation should pre-emptively identify and mitigate gender risks. Specifically, there are multiple documented instances where legal provisions that intend to work

¹¹⁹ W. Mutagwaba, pers. comm.. May, 2017.

¹²⁰ Hinton, J. (2010). Recommendations for Class C Mining regulations and their Implementation and Future Amendments to the Mining and Minerals Act in Liberia, USAID Governance and Economic Assistance Program, USAID Report No. PN-ADT-546, 92p.

¹²¹ Hinton, J. (2017) Gender Impact Assessment Tool for ASM Technical and Formalization Interventions, Report to Partnership Africa Canada (PAC).

in women's interests pose risks of actually working against them. Examples include blanket bans on pregnant women from *any* job in ASM sites or lack of provisions for "early and safe return to work" following delivery, both of which can result in loss of jobs for women impoverishing them and their families even further and increasing risks of human rights abuses against vulnerable women by authorities for non-compliance, etc.¹²².

Current Compliance Capacity

Currently, less than 5% of all Ugandan ASMs production is licenced under the current mining legislation, and many stakeholders in the sector are unaware of any legal requirements for their activities.¹²³

Lack of awareness of and limited capacity to fulfil current legal requirements undoubtedly plays a role in low levels of compliance. As discussed in the Section "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition", adult literacy rates are fairly low in Uganda, and, given low socio-economic status of most mineworkers, are likely to be even lower in ASM Development Minerals. Furthermore, access to financial capital is one of the biggest barriers for many Development Minerals miners, and they are not likely to be able to afford the travel to Kampala and the cost of the permit itself without some form of support. Given gender disparities in language, literacy and socio-economic status, women may experience greater challenges than men in applying for a Location Licence. This is likely to be compounded by their heavy domestic work burdens, making it difficult to leave children and other family members, and, in many cases, women's lack of autonomy or freedom to travel without permission from husbands.

Clear disincentives to informality include both occasional fines and penalties imposed by environment police (reported at some ASM sites) and, in many cases, exorbitant revenue shares accruing to landowners (*de facto* royalties). In any event, and in view of capacity constraints faced by the majority of the ASM workforce coupled with high formalization costs, bureaucratic requirements and inappropriate licencing criteria, few ASM operators are likely to obtain and maintain legal status under the current system.

Furthermore, as demonstrated in a multitude of ASM jurisdictions over the past 3 decades, "carrot-and-stick" approaches to policy and legislation are unlikely to work if only "sticks" are on offer. The overwhelming emphasis of central and local government on taxation and punitive measures is concerning and ideally would recognize the reality of the ASM workforce and the diversity of ASM in the country¹²⁴. Even if a less costly and onerous legal process is introduced in planned reforms, if no clear benefits are yielded from legality – such as sustained access to information, training,

¹²² Ibid.

¹²³ UNEP (2012). Analysis of formalization approaches in the artisanal and small-scale gold mining sector based on experiences in Ecuador, Mongolia, Peru, Tanzania and Uganda: Uganda Case Study.

¹²⁴ Based on stakeholder submissions at the Nov. 14-15, 2017 Validation Workshop in Kampala and current efforts to institute and staff a 200-strong workforce of Mining Police in DGSM. Although some indications are that the Mining Police will play a much needed community policing role (e.g. including in response to gender based violence and conflict in ASM sites, for example), the unit and its officers will require substantial training and support to understand the diversity of ASM in Uganda (e.g. by commodity and in terms of "illegal" versus informal and extralegal ASM) in order to effectively support sector transformation via their mandates.

equipment, financing or other support that could tangibly improve the lives of ASM mineworkers – then widespread formalization of ASM Development Minerals is likely to remain elusive.

Institutions Governing ASM Development Minerals

The institutional framework is critical to sectoral transformation, as the institutions that govern the sector are responsible for regulating occupational, environmental, labour and social practices, as well as providing essential services to the ASM workforce. The role played by these institutions is designed to safeguard both the environment and the population, as well as ensuring socio-economic benefits to the ASM workforce by providing incentives and mitigating technical capacity gaps. The main roles and mandates of central and local government institutions are outlined below.

Central Government

Ministry of Energy and Mineral Development (MEMD)

In as far as the Development Minerals sector is part of the minerals sector, the main institution primarily responsible for its governance is the Ministry of Energy and Mineral Development (MEMD). Under the Minerals Policy (2001), the mandate of the MEMD is:

"to establish, promote the development, strategically manage and safeguard the rational and sustainable exploitation and utilization of energy and mineral resources for social and economic development."

MEMD provides the overall policy direction for the Ugandan minerals sector, works to attract investment into the sector, oversees the activities of private companies in the sector to ensure that resources are being extracted sustainably, issues statutory instruments and provides oversight of and offers guidance to DGSM (below) on its mandate and functions such as promoting the sector.

Directorate of Geological Survey and Mines (DSGM)¹²⁵

DSGM is the government body responsible for the implementation of the Mining Act (2003) and Regulations (2004) as well as for the administration and management of, and support to, the minerals sector. Most of its activities are run from the central office in Entebbe, because, although there are regional offices in Mbarara, Kabale, Tororo and Moroto. they have very limited resources.¹²⁶

The department's mission is *"to promote and ensure rational and sustainable development and utilization of mineral resources for socio-economic enhancement of the people of Uganda"*¹²⁷ DSGM assesses, grants and monitors the performance of all mineral licenses, although, given the original exclusion of several Development Minerals from the Mining Act (2003), this does not apply to sand, stone and clay. As Lead Agency for environmental issues under the National Environmental Act, DSGM is also responsible for Environmental Impact Assessments (EIAs) and environmental

¹²⁵ Department of Geological Surveys and Mines, Accessed 11th October 2017. <http://www.energyandminerals.go.ug/>

¹²⁶ Hinton (2012)

¹²⁷ Hinton et al. (2011)

audits. DGSM collects and distributes production statistics and is also in charge of geo-data reporting, collection and analysis.¹²⁸

There is no specific department for ASM in DGSM, however the 2001 Minerals Policy tasks the DGSM to: *“Regularize and improve artisanal and small-scale mining through light-handed application of regulations, provision of information on production and marketing, provision of extension services through miners’ associations and implementation of awareness campaigns targeting artisanal and small-scale miners.”*¹²⁹ This mandate over ASM affairs is likely to increase under the proposed policy and legal reforms although such efforts are likely to be dwarfed by roles of the newly instituted Mining Police unless substantial increases in DGSM staffing, financial and physical resources are not availed¹³⁰.

The DGSM has recently been restructured from a department to a directorate, which is comprised of three departments: Geological Survey, Mines and Geothermal Resource Departments, listed below:

1. **Mines Department:** Issues licenses and permits, manages the mining cadaster, collects revenues and statistical data, in charge of inspection, regulation and enforcement. Most ASM functions fall within this department.
2. **Geology Department:** Conducts geoscientific surveys, mapping, assessments, investigations and offers advice to the public relating to minerals and geology. Prepares maps, illustrations and mineral rights titles, assists mineral rights applicants to identify area coordinates for the applications, manages the department’s geological data. Under laboratories division, the geology department carries out investigations on the processing of minerals, chemical analysis of rock, ore, mineral and water samples, evaluates mineral processing methods currently used in Uganda and investigates ways to upgrade or improve these methods.
3. **Geothermal Department.** Conducts exploration, sector promotion and related activities as needed to support advancement of Uganda’s promising geothermal energy subsector.

Ministry of Water and Environment (MWE)¹³¹:

The MWE is in charge of the national policy, standards and regulations relating to the management of water and the environment.¹³² It monitors the provision of water for use in agriculture and rural industries including mining.

¹²⁸ Barreto et al. (2017)

¹²⁹ Ibid.

¹³⁰ As reported in the Nov. 14-15, 2017 Validation Workshop in Kampala, current plans of DGSM are to designate ASM mandates to certain officers in the understaffed Department of Mines and consider over time the potential and need to establish an ASM Unit or Department.. The emphasis on ASM policing rather than support functions of GOU is suggested by institution of Mining Police, whose workforce is ultimately expected to number 200.

¹³¹ Ministry of Water and the Environment, Accessed 11th October 2017. <http://www.mwe.go.ug/>

¹³² Barreto et al. (2017)

National Environmental Management Authority (NEMA)¹³³:

NEMA is the principal agency in Uganda responsible for the coordination, regulation, monitoring and supervising of environmental management, promoting the development of environmental policies, laws, regulations, standards and guidelines.¹³⁴ The agency is also charged with contributing to the “*wise use of natural resources*”. On a practical level this includes the review and approval of all EIAs, Environmental Audits (EAs) and lead sectoral agencies such as the DGSM to ensure the appropriate application of environmental legislation.

At an ASM site level, NEMA also coordinates with and oversees the activities of District Environmental Offices (DEOs) who are positioned to provide guidance, monitor and inspect ASM areas but rarely undertake this outreach.¹³⁵

National Forest Authority (NFA)¹³⁶:

The NFA is mandated to manage all central forestry reserves, and when mining activities fall within their protected areas such as gazetted parks or forests, the NFA is considered as the “land owner” and they must therefore provide written approval and support for mining to occur. The agency however does not have any procedures or protocols concerning how to handle this interaction with the minerals sector currently.¹³⁷ With respect to ASM, most activities take place outside of forest reserves, the exception being a number of clay mines throughout the country.

Ministry of Gender, Labour and Social Development(MGLSD)¹³⁸:

The MGLSD is mandated to play an active role in supporting gender mainstreaming within the minerals sector, promoting decent working conditions and mitigating child labour in association with the Department of Occupational Safety and Health. They are also charged with protecting vulnerable persons from livelihood risks.

MGLSD oversees a number of officers with mandates relevant to ASM and better situated to extend services, including District Labour Officers (DLOs) and Community Development Officers (CDOs). The latter fulfil key functions in supporting formation and registration of local organizations and cooperatives.

Ministry of Local Government(MoLG)¹³⁹:

The MoLG’s mandate is to empower local government and reduce the workload on central offices, as well as promoting local economic development. Of particular relevance to mining, local governments (as described in the next section) are in charge of receiving, reviewing and forwarding applications for mining and exploration rights in line with legislative requirements, and to arbitrate in compensation disputes or other conflicts. Given that local governments, districts in particular, are staffed with a number of officers from line ministries who are positioned to address

¹³³ National Environment Management Authority, Accessed 11th October 2017. <http://www.nema.go.ug/>

¹³⁴ Ibid.

¹³⁵ Barreto et al. (2017)

¹³⁶ National Forest Authority, Accessed 11th October 2017. <http://www.nfa.org.ug/>

¹³⁷ J. Hinton, I. Kabongo, C. Kabiswa, J. Okedi, R. Mbabazi (2011)

¹³⁸ Ministry of Gender, Labour and Social Development, Accessed 11th October 2017. <http://www.gou.go.ug/ministry/ministry-gender-labour-and-social-development>

¹³⁹ Ministry of Local Government, Accessed 11th October 2017. <https://www.molg.go.ug/content/about-us>

critical gaps in ASM Development Minerals, multiple stakeholders have called for a greater role in governance of the sector¹⁴⁰.

Ministry of Health (MoH)¹⁴¹:

The MoH has the capacity to extend programs to ASM areas to inform about high risk behaviour for HIV/AIDS, sexual and gender based violence (SGBV) or implement a Village Health Worker model of care at ASM sites.

Uganda Police Force (UPF)¹⁴²:

The Ugandan police force in coordination with DGSM have an important role in addressing issues relating to the illicit minerals trade and potential linkages with the illegal arms trade. Furthermore, in conjunction with the Ugandan Police, NEMA additionally oversees and coordinates the Environment Police and a unit of Mining Police, that is currently being installed within the DGSM.

Uganda Wildlife Authority (UWA):

When mining activities fall within protected areas such as gazetted parks or game reserves, the UWA is considered as the “land owner” and they must therefore provide written approval and support for mining to occur. The agency however does not have any procedures, rates of rent, or protocols concerning how to handle the interaction with the mineral sector.¹⁴³

Other Relevant Agencies:

These include the Ministry of Finance, Planning and Economic Development (MFPED); Uganda Investment Authority (UIA); Uganda People’s Defence Forces (UPDF) and the Uganda Bureau of Statistics (UBOS)

Local Government

Local governments play a key role in the governance of Uganda. The decentralisation and devolution of local government were formally adopted following the promulgation of the 1995 Constitution and the 1997 Local Governments Act, where a clear distinction was made between the roles of central and local governments. The mandate for local governments includes

the provision and maintenance of services such as education, medical and health, water, and road, among others.¹⁴⁴

Taking into account the devolved governance functions of local government in Uganda, there is significant potential to leverage this to improve governance of the Development Minerals sector locally, for example through the provision of support services to miners, or through processing of mining applications. Nevertheless, engagement with local government representatives over the course of the field mission highlighted a lack of clear direction within the local government

¹⁴⁰ Based on input compiled during Stakeholder Validation Workshop for the Baseline Assessment report held on Nov. 14 and 15th, 2017 in Kampala, Uganda.

¹⁴¹ Ministry of Health, Accessed 11th October 2017. <http://health.go.ug/>

¹⁴² Uganda Police Force, Accessed 11th October 2017. <http://www.upf.go.ug/>

¹⁴³ J. Hinton, I. Kabongo, C. Kabiswa, J. Okedi, R. Mbabazi (2011)

¹⁴⁴ Ministry of Local Government, Government of Uganda (1997). Local Governments Act. Accessed 13th September 2017. <https://www.molg.go.ug/sites/default/files/LOCAL%20GOVERNMENTS%20ACT.pdf>

offices with regards to their mandated activities. This was compounded by a shortage of human and material resources and inadequate coordination with DGSM/MEMD as needed to contribute positively to sectoral management. Given the localised nature of a sizeable proportion of the Development Minerals economy this is a missed opportunity, which cannot alone be filled by central government structures.

As the comparative policy and legal framework review demonstrates, the devolution of support services and administrative functions of Development Minerals ASM governance to local levels could facilitate improved access to mineral rights, a more propitious enabling environment for formalisation and improved regulation of mining activities.

Institutional Mandates and Functions

When devolution was formalised in Uganda, roles and responsibilities of Central and local governments were divided between the two. According to the 1997 Local Governments Act, local governments were assigned a broad mandate, and a high degree of autonomy over their activities, budget allocation and forms of revenue generation they could pursue. Almost all aspects of mines, minerals and water resources management have historically been a Central Government function. Current areas of overlap mainly relate to taxation which can lead to risks of over- and double-taxation.

Nevertheless, the Local Governments Act sets out a long list of mandated activities for which local governments are responsible in their district, several of which encompass aspects of the extractives sector and its workforce. These include 'land administration', 'physical planning', 'forests and wetlands', 'licensing of produce buying', 'trade licenses', 'cooperative development', 'labour matters', 'women in development', 'community development', and 'youth affairs'.

However, the degree of autonomy granted under the Local Governments Act leads to confusion with regards to what the mandated activities entail, and what are the functions and services that deliver on those mandates, particularly with respect to the minerals sector. The lack of clear guidance on functions and services leads to lack of uniform application of the mandates across districts. This confusion is exacerbated in the case of Development Minerals, where the former exclusion of certain Development Minerals from the Mineral Policy (e.g. clay, stone, sand) leaves governance gaps that are assumed neither at national level or the local level, but to which neither are strictly accountable. In a context of limited resources, this has resulted in the non-fulfilment of essential governance functions.

Key offices who are positioned to play a role in filling these gaps include, but are not limited to the following:

District natural resources offices. These are, in general, responsible for forestry, environment and land management and physical planning. The line ministries for the Natural Resources Department are the Ministry of Water and Environment (MWE), and the Ministry of Lands, Housing and Urban Development (MLHUD). District Natural Resources departments are headed by a District Natural Resource Officer (DNRO).

- The departments' overall objective is to promote and ensure the sustainable use and management of natural resources, namely land, water/wetlands, vegetation and forests. The department is responsible for overseeing and guiding the sustainable use of natural resources, ensuring effective and sustainable environmental management. and linking or coordinating with the various line Ministries such as the MWE, the

Ministry of Energy and Mineral Development (MEMD), the MLHUD, and the Ministry of Finance, Planning and Economic development (MoFPED).

- The department also works with related semi-autonomous agencies like the National Environment Management Authority (NEMA), the National Forestry Authority and the Uganda National Meteorological Authority (UNMA), among others.
- Physical planning, which includes planning and oversight of local government instituted civil works projects (e.g. roads, buildings) are additionally well positioned to provide a new market for ASM-produced Development Minerals.
- Most districts operate by dividing into subsectors that include Environment and Wetlands, Land Management (surveying, physical planning, cartography, valuation, registration of titles), and Forestry, each with their respective officers. More recently, district Natural Resources departments have started to address issues regarding climate change, disaster risk reduction, and energy.

It is common for different departments to compete for the same human resources. For example, in some districts the natural resources officer is also doing the work of the environment officer and/or the forestry officer. There are also cases in which the creation of new districts has led to one officer being stretched across two districts. This results in the over-stretching of already sparse resources, and in the inability for the officer to fulfil the activities mandated to them.

The Community Based Services Department is responsible for the socio-economic and cultural wellbeing of its constituents, with a particular emphasis on the disadvantaged and most vulnerable members of the community. The line ministry for the Community Based Services Department is the Ministry of Gender, Labour and Socio-Economic Development. Little interaction was observed between this department and the Natural Resources Department, constituting a missed opportunity for harmonisation of activities conducted by both regarding the Development Minerals sector and its stakeholders. Community Development Officers (CDOs) at both district and subcounty levels could play roles in supporting formation and registration of ASM organizations, among other functions.

Other key officers include District Commercialization Officers (DCOs) who could play roles in marketing and trade of ASM Development Minerals products, District Health Inspectors (DHOs) including with respect to improving awareness, diagnosis and treatment of common occupational health risks (See section on "Institutional and Technical Operating Context") and District Labour Officers, who could aid in establishing more formal labour systems in ASM sites and organizations.

Current Engagement in Development Minerals

Local government representatives have reported that engagement with the ASM Development Minerals sector is very rare, and the vast majority of engagement was limited to where the mining activities create environmental concerns. Current engagement with the sector is led in most districts by the District Natural Resources Officer and the District Environment Officer, particularly when ASM activities are taking place in wetlands, alongside rivers, or in forested areas. Areas of involvement theoretically include the enforcement of environmental regulations in ASM areas, sensitisation of ASM communities on environment issues, environmental restoration/land management of areas degraded by mining and support in the process of conducting EIAs. However, lack of resources is a serious limiting factor for these activities.

Other engagement activities include training and sensitisation on occupational health and safety issues, and, in the case of Kabale district, the provision of small grants and loans to ASM community-based organisations under the Youth Livelihoods Programme and Women's Entrepreneurship Programme.

Five of the nine districts interviewed spoke of involvement by the Environmental Police in the Development Minerals ASM sector, although these interactions tend to go undocumented and are not in collaboration with the district offices. In two districts, reports of potential extortion by the environmental police were raised as challenges to the regulation of the sector.

Revenue Collection

Revenue collection from Development Minerals ASM activities varied from district to district, and is in general very low. In fact, in 2013, only 1.5% of all reported subnational government revenue was generated through taxation.¹⁴⁵ Three out of nine districts interviewed cited no revenue collection from the sector. The remaining six declared that some revenues were being collected, particularly from the transport of minerals in the form of a roadside tax but this was largely instituted at subcounty rather than district level. Some districts taxed trucks transporting mineral from mine site to point of sale, one by granting licenses to companies within their district, and one via the taxation of firewood trucks used predominantly in the operation of limestone kilns.

These road toll charges can range from between 5000 and 20000 Ugandan Shillings per trip, depending on the type and quantity of mineral being transported, and are a particularly widespread practice for sand and wood. However, these road toll charges often lacked clear mechanisms for feeding back into local government accounts, and local government officers reported a lack of awareness as to where the collected funds are distributed within the department or sub-country offices.

Planned Engagement

Whilst the majority of district offices showed a willingness to engage with the sector, resource-permitting, none of them had developed plans for increased engagement. This suggests that this is more of an aspiration than a fully conceived policy focus. The reasons for this are two-fold: lack of both human and material resources, and lack of awareness about the growing importance of the sector, as reflected in the current ACP-EU Development Minerals programme and Mining Policy review. During the Multi-Stakeholder Validation Workshop, numerous districts expressed interests in taking on bigger roles in both tax collection and provision of some services, with many specifically citing potential roles of the District Commercialization Officers.

Main Barriers and Constraints

A number of critical constraints were identified that must be overcome in order to more effectively engage local governments in governance of ASM Development Minerals. These include the following:

Lack of understanding of the sector. A lack of knowledge and understanding of the sector is a major barrier to informed regulation with and by local governments. This seems to stem from a shortage of reliable and up-to-date data on the sector and lack of coordination with central

¹⁴⁵ OECD (2013). Uganda. Accessed 3rd October 2017. <https://www.oecd.org/regional/regional-policy/profile-Uganda.pdf>

government. Inadequate or non-existent record-keeping at ASM sites make obtaining current and historic data very difficult, and lack of human and material resources at district office level hinder the collection of reliable data. This has resulted in some confusion as to how best to manage the sector, and which functions and services need to be performed in order to improve formalization levels and fulfil official mandates.

Disconnect between central and local governments. Seven out of the nine district offices interviewed cited a challenging disconnect with MEMD/DGSM, and expressed a wish for better communication between the two, especially with regards to policy decisions, licensing and sector regulation. The desire for a greater MEMD/DGSM presence at local level, in the form of visits to district offices or designation of a full-time 'point-person' (e.g. District Mines Officers), was also expressed. These communication challenges were also highlighted by a lack of awareness about the project, Central Government's vision regarding Development Minerals, or about the current Mining Policy review process. Communication failures within the district offices themselves were also sometimes suggested, for example in the case where the Chief Administrative Officer was aware of mineral sector reform processes while other relevant officers were not.

Lack of clarity regarding local government mandates in the sector. This was cited repeatedly as a challenge for the local government representatives interviewed. The main challenge was seen to be that local government mandates were not streamlined with Central Government mandates, hindering the process of regulating mineral extraction by creating confusion as to who should do what.

Political interference. Six out of nine districts cited undue political interference from above as a barrier to them adequately performing their work. This disrupts proper procedures for the regulation of the sector. Awareness of sectoral laws and stronger linkages with DGSM and other authorities (e.g. NEMA) would help to prevent this (e.g. through verification of licence approvals or directives).

Lack of human and material capacity. Irregular support and inadequate workspace, internet, vehicles, computers and printers were cited in all districts visited. This lack of capacity prevents the local government officials from being able to carry out their day-to-day tasks, such as monitoring mine sites and ASM communities. Lack of GIS capacity in most offices (Wakiso representing an important exception) may be a major impediment to coordinating any sort of licencing functions although some sort of on-line cadastre could rectify this situation. Lack of technical understanding of the Development Minerals sector was also cited as a challenge, particularly given the unique technical, environmental and occupational characteristics of the sector.

Draft National Mining and Minerals Policy

With regards to ASM Development Minerals, there is a discernible shift in the spirit of the draft NMMPU when compared with the 2001 Mining Policy, including the specific reference to previously excluded minerals, including sand, clay, murram, stone and other Development Minerals. This is most evident within:

Objective 15, which details specific measures to be taken to “organise, license, regulate and transform artisanal and small-scale mining into viable and sustainable mining entities in Uganda”.

Objective 19, which seeks to “legislate on and regulate commercial exploration, development and exploitation of non-mineral substances excluded from the definition of minerals in article 244(5) of the Constitution”.¹⁴²

The main strategies that the GoU commits to undertake as a means to achieve these objectives are outlined in Box 4. These measures form a progressive strategy to encourage ASM entities to operate within the legal and regulatory frameworks, a pre-condition for the progressive formalisation of the sub-sector by reducing barriers to entry, facilitating ASM development through technical, financial and other sector-specific support mechanisms, improving environmental and social performance, and by reaffirming the legitimacy of ASM mineral rights claims.

However, noting the historical impact resulting from the exclusion of these minerals notably in terms of organization, as noted above, a policy shift is only the first step in improving their management. Longer-term support measures will be needed to facilitate their incorporation into the formal economy.

The details of how these measures shall be carried out and objectives shall be achieved will largely be determined by upcoming laws and regulations. Progress towards ensuring that ASM Development Minerals operators function within the requisite legal and regulatory frameworks is likely to be relatively slow (in the absence of outside intervention), at least until sectoral reforms are completed and the DGSM and other actors have taken necessary steps to support sector development.

In this respect, considerations for the current Policy and at the very least through clarification in law and related institutional strategies, include the following:

- *The draft NMMPU requires clarity in terms of institutional mandates and government roles in strategy implementation.* Although strategies to inspect, guide, provide, facilitate, establish and take other actions to support ASM are essential to sector development, the vehicle for implementation is unclear. Unlike numerous other jurisdictions where ASM is widespread, a separate unit, office, departments or even authority is commonly mandated to provide extension services, support organization and licencing of ASM, strengthen links with markets and other stakeholders, among other.
- *Local government and related coordination arrangements should figure more prominently.* This includes with recognition in strategy implementation, described above, but also in terms of the need for explicit recognition of the need to strengthen coordination with and mandates of local government and specific offices therein.

¹⁴⁶ Notably, Article 244 of the Constitution of Uganda (1995) defines that clay, murram, sand or any stone commonly used for building or similar purposes are not considered minerals, resulting in their exclusion from previous mining law. Clearly, the new proposed policy seeks to overcome this Constitutional barrier, while explaining their limited attention from mining authorities and illustrating their increased importance to the minerals sector.

BOX 5: MEASURES IN THE DRAFT MINERALS POLICY THAT ARE RELEVANT TO THE ASM DEVELOPMENT MINERALS SECTOR¹⁴⁷

NMMPU Strategies to achieve objective 15:

- a. “establish a framework for licensing, regulation and monitoring of ASM activities including defining the scope of ASM;
- b. encourage, through the permitting process the collaboration and co-existence between existing bonafide ASMs and other mineral rights holders;
- c. collaborate with development partners and civil society to promote best practices in the ASM subsector;
- d. ensure that Artisanal mining is a preserve for Ugandan citizens and encourage joint ventures for Small-scale mining operations;
- e. establish national programs that ensure occupational health, safety and environmental hazards associated with ASM are reduced to the barest minimum;
- f. inspect, guide and provide extension services and training in mineral production, processing and value addition;
- g. encourage establishment of buying centres for mineral commodities for ASM;
- h. facilitate and encourage ASM participation in supply chain initiatives;
- i. establish mechanisms for ASM to access financing;
- j. continuously and accurately map out areas for bona fide ASM prior to granting of corresponding mining licenses;
- k. keep an updated register of Artisans and Small-scale Miners;
- l. encourage Artisanal miners to form associations for their operations; and
- m. collaborate with mining companies to develop the skills of local artisans and small-scale miners.”

NMMPU strategies to achieve Objective 19 include to:

- a. “ensure that commercial exploitation of substances excluded from the definition of mineral in article 244 (5) of the Constitution including sand, clay, murram and any stone are legislated upon and regulated;
- b. regulate the commercial exploration, development and exploitation of substances excluded from the definition of minerals in article 244 (5) of the Constitution including sand, clay, murram and stone used for building or similar purposes; and
- c. create a fiscal regime for substances excluded from the definition of minerals in article 244 (5) of the Constitution that are developed and produced for commercial purposes.”

- *Supply Chains versus Value Chains.* Use of the term “supply chains” commonly denotes the trading chain, which most commonly pertains to gold, tin, tantalum, tungsten and similar minerals. Value Chain more explicitly accounts for the need to prioritize value addition to a range of minerals, including gold and 3Ts, as well as Development Minerals and others. Although value chains are considered within the draft NMMPU, more explicit emphasis on ASM and SMEs would pave the way for greater responsiveness in subsequent institutional strategies, laws and regulations.

¹⁴⁷ UBOS (2016)

- *“Bona fide” ASM*¹⁴⁸. Most ASM throughout Uganda takes place on exploration licences held by others and only about 5% are operating within legal bounds. Currently, a significant proportion of Development Minerals miners identify licence holders as “landowners” in areas where they work, with no awareness of current law. This poses a risk that the majority of ASM operators will be excluded from the support they need in order to formalise and be integrated into the mainstream, because of their lack of understanding that they are currently informal. Women are particularly vulnerable to this sort of exclusion. As expressed by Buss et al (2017), even within a formal, legal concession, their work in ASM is often “invisible”, i.e. regarded as casual, is less valued or more likely to be intermittent. Care must be taken to ensure that women are not left behind in formalisation efforts because of these perceptions.
- *Mapping out ASM areas*. It is unclear as to whether this will be the *only* strategy to identify ASM areas (i.e. government identifying reserves) or self-identification of suitable areas by ASM operators will still be permitted. In the case of the former, external designation of ASM reserves tends only to be appropriate under certain circumstances (e.g. Lake Katwe salt works) while in other cases, can escalate costs to government that may be better placed elsewhere (e.g. on extension services). When used as a strategy to mitigate competition between larger companies and ASM, such approaches must be cautiously applied in order to mitigate and prevent conflict rather than exacerbate it. Furthermore, this and some of the other ASM specific strategies outlined in the NMMPU seem to have been developed in response to ASM gold rush scenarios, requiring deeper scrutiny with respect to applicability to other facets of the ASM sector.
- *ASM Strategies: Definition, Planning, Budgeting and Monitoring and Evaluation*. In 2008, Uganda developed a National Strategy for the Advancement of ASM in Uganda, most of which was not implemented and much of which requires updating given current conditions. The commitment in the NMMPU to develop a “framework for licencing, regulation and monitoring” alludes to the potential to develop an updated strategy, the extension services aspect of formalization (although captured in other policy strategies) should also be integral to a framework. Finally, the NMMPU would be strengthened in this respect if the definition of “framework” more explicitly assured commitments to also define institutional set-ups, coordination arrangements, planning and budgeting processes.

Key Lessons from Other Jurisdictions

This comparative assessment of policy and legal frameworks considers the mining policies and key legal documents from four countries in Sub-Saharan Africa, South America and Asia, namely Kenya, Senegal, Brazil and India. They were chosen for a variety of reasons, including the occurrence of development minerals, recent updates to mining legislation, comparable income levels to Uganda, and the differentiation in their frameworks from Development Minerals from

¹⁴⁸ Drawn from a submission to the Government of Uganda in conjunction with requests for inputs into the Draft NMMPU. The comprehensive gender analysis of the NMMPU by DRASPAC, Carleton University and Impact was developed based on findings, conclusions and recommendations from the 3-year GROW Project on women in artisanal mining in East and Central Africa.

other minerals. Their selection does not necessarily imply “best practice” but analysis of their approaches provides a basis from which some good practices can be drawn.

The purpose of this high-level assessment is to identify examples of good practice that seek to create an enabling environment for the ASM extraction of Development Minerals. An enabling environment in this context accounts for the social, financial, technical and economic particularities of ASM (in particular of Development Minerals); promotes small and medium scale enterprises (SMEs) and other effective forms of mining associations; protects the rights and opportunities of vulnerable groups *directly* and *indirectly* impacted by mining operations; adequately addresses the environmental challenges posed by the sector; provides sufficient clarity relating to the rights and responsibilities of ASMs with respect to other minerals rights claimants, and; establishes an effective institutional framework to ensure that access to the above is 1) practically speaking, attainable and 2) likely to result in net benefits of operations that adhere to the rules outlined therein *vis-à-vis* operations that do not.

The assessment of each of the 4 country policy and legal frameworks is not exhaustive, but rather conducted with a view to drawing insights on practices that should be replicated or avoided in the case of Uganda.

In the following section the good practices identified in this rapid assessment are benchmarked against the existing legal and policy frameworks relating to development minerals in Uganda, in order that recommendations can be developed to be considered during the forthcoming redrafting of Uganda’s Mining Act, 2003.

Selected Case Studies

Kenya

In 2016, Kenya updated its Mining Act (Mining Act 2016) to replace the outdated and ineffective Mining Act, Cap 306 of 1940. The previous act excluded Development Minerals including clay, murrum, limestone and sandstone as well as other common mineral substances, but the new legislation will regulate rights and interests for all kinds of minerals including construction and industrial minerals. The mining sector in Kenya is governed by the Ministry of Mining and mineral rights are dealt with by the Mineral Rights Board (MRB).

The new legislation in Article 4 defines artisanal mining for the first time in Kenyan legislation as: ‘traditional or customary mining operations using traditional or customary ways and means’. Development Minerals in Kenyan law are called ‘construction minerals’ and defined as including stones, gravel, sands, clay, volcanic ash, volcanic cinder and any other materials used in the construction of buildings, roads, dams, aerodromes and landscaping or similar works. Other materials may be declared to be construction minerals as well by the Cabinet Secretary at a later date through publishing a notice in the Gazette.

In its Mining Policy, the Ministry of Mining expresses commitment to the sustainable growth of the mining and minerals resources sector including the development of small-scale mining and artisanal mining. Kenya is currently developing an Artisanal Mining Strategy which will guide how artisanal mining (AM) is handled with new legislation and incorporates both Development Minerals as well as other minerals such as gold. The Artisanal Mining Strategy will be implemented by the Artisanal and Small-scale Mining Technical Committee which may provide the foundations for the establishment of a permanent unit in the Ministry of Mining to manage AM.

At the county level, the 2016 legislation details that an Artisanal Mining Committee, headed by a representative of the Director of Mines, shall advise the Director of Mines in the granting, renewal or revocation of artisanal mining permits. This advisory role does not extend to small-scale mining permits, which will be treated by the MRB. The institutional reorganisation is informed by a broader process of devolutions, comparable to (although more recent) than that witnessed in Uganda. Nonetheless, it serves the practical purpose of administering AM licences locally, which should avoid a build-up of licence applications at the central level, as witnessed in other jurisdictions. It further means that those treating the technical evaluation of licences will be closer to the geographies over which they are responsible – evaluation of licence applications will therefore likely account for proximate factors that may be missed at the central level. Finally, lodging a simplified application at the County level will facilitate access for AMs to licences by reducing the administrative burden and demystifying the application and evaluation process.

According to Article 95 of the Mining Policy, to access an AM permit the person must be a citizen of Kenya, attained the age of majority and be a member of an artisanal mining cooperative association or group. Article 98 of the Mining Policy requires that AM must observe 'good mining practices, health and safety rules and pay due regard to the protection of the environment' (the regulations for health and safety of AM operations are still to be prescribed by the Cabinet Secretary), but is not required to complete an Environmental Impact Assessment. AM permits last for 3 years and can be renewed once, as well as converted into a small-scale mining permit. The Mineral Rights Board advises the Cabinet Secretary of Mining as to the areas that are suitable for AM and SSM, designating what areas are eligible or unsuitable.

Unlike AM, SSM permits are granted at the central government level and are required to provide evidence that they have the technical and financial capacity to carry out the proposed mining operations. The Kenyan Ministry of Mining is still working on adapting to new legislation and the reorganising to include construction minerals within the same framework as other minerals. SSM operations are not permitted to use specialised mechanised mining technology including explosives putting SSM quarries at a disadvantage as it does not recognise the need of even smaller quarries for this type of equipment. SSM are not permitted to produce more than 25000m³/year or 68 m³/day by law, which is also not well adapted for the needs of construction minerals that are generally measured in tonnes and produce larger volumes of lower value than minerals such as gold or gemstones.

Key Legislation

- Mining Act 2016¹⁴⁹
- Mining Policy 2016¹⁵⁰
- Artisanal Mining Policy 2017¹⁵¹

¹⁴⁹ Kenya Mining Act (2016) <http://kenyalaw.org/lex/rest//db/kenyalaw/Kenya/Legislation/English/Acts%20and%20Regulations/M/Mining%20Act%20No.%2012%20of%202016/docs/MiningAct12of2016.pdf>

¹⁵⁰ Kenya Mining and Minerals Policy 2016 <https://www.idlo.int/sites/default/files/pdfs/highlights/Kenya%20Mining%20Policy%20Popular%20Version-LowRes.pdf>

¹⁵¹ The Artisanal Mining Policy has been developed but not yet made public. Levin Sources was an advisor to the Kenyan Ministry of Mining for the Artisanal Mining Policy.

Key Takeaways

- **Production volume limits in legislation** can disadvantage or advantage certain types of minerals if they are set as universally applicable for all minerals. Limits need to take into consideration the value and average production of the type of mineral being produced, the range of methods and organizational structures in place so as to make figures reasonable for different types of minerals and diversity methods therein (e.g. “artisanal” versus “small scale”). The production limit for minerals such as gold and construction minerals like clay should not be the same.
- **Standardising the legislation and management of AM for all minerals including Development Minerals** means that the management of Development Minerals will be unified under one department, with devolution to counties through representatives of the Ministry of Mining at the County level.
- **The Kenyan Policy and legal framework has been overhauled; the implementation of the new framework will take time and sufficient resources to realise.** The implementation of the policies and laws in the coming years could provide a useful and relevant case study to neighbouring country Uganda as to ways in which AM and Development Minerals can be managed.

Brazil

Brazil is currently undergoing a reform of its mineral law. The sector is currently regulated by the 1967 Mining Code and the Regulation of the Mining Code (1968), which approved the 1967 Code. In July 2017, major changes to current legislation were introduced through Executive Orders (MPs), that need to be approved by Congress within 120 days, in which case they will be processed as bills of law. This process is still underway at time of writing. For the purposes of this report, the 2017 changes have been taken into account.

The mining sector in Brazil is regulated by the Ministry of Mines and Energy (MME) and the National Department of Mineral Production (Departamento Nacional de Produção Mineral - DNPM), both Federal bodies, responsible for the granting and administration of mining permits.

There are four different types of mineral license in Brazil. The distinctions have been made to take into account the “diversity of mineral substances, the levels of difficulty of their extraction, the end use of the products and social aspects”.¹⁵²

The four licenses are:

- Exploration and Mining (Autorização e Concessão)
 - All mineral substances
 - Obligatory if you want to exploit metallic minerals, substances destined for industrialisation or mineral water.
- Licencing

¹⁵² DNPM. Carta de Serviços ao Cidadão. <http://www.dnpm.gov.br/aceso-a-informacao/institucional/dnpm/documentos/carta-de-servicos-do-dnpm>

- Minerals that are extracted for immediate use in civil construction, red clay and agricultural lime; and provided exclusively to the landowner or to someone to whom the landowner has given their permission.
- PLG (Artisanal Mining License)
 - For 'artisanal minerals' as defined in the Mining Code
- Extraction license
 - Minerals for immediate use in civil construction, only granted to government bodies, for sole use in public works executed directly by the government body who holds the license.

Development Minerals is not a term that is used in Brazilian legislation. However, non-metallic construction minerals that make up the majority of this report's definition of Development Minerals¹⁵³ and are all included under the Licensing Regime. Semi-precious stones being the only example of Development Minerals that are eligible to be artisanally mined under Brazilian Law.

For the mining of Development Minerals, then, the 'Authorisation and Concession' and the 'Licensing' regimes are the only two options for those other than semi-precious stone (based on the list of 'artisanal minerals' provided). DNPM advises that in general, the 'Licensing' regime is a much quicker and cheaper process, as it doesn't demand exploration works, and all the protocols take place locally. On the other hand, 'Licensing' is dependent on City Councils and landowners, which can introduce complications into the process. It is possible to change an 'Authorisation and Concession' regime to a 'Licensing' regime.

Key legislation

- Mining Code (1967). Law n° 227, 28th February 1967¹⁵⁴
- Executive Orders (2017). Executive Order n° 790, 25th July 2017¹⁵⁵
- 'Licensing Regime'. Law n° 6.567, 24th September 1978¹⁵⁶
- Artisanal Mining Regulation. Law n° 7.805, 18th July 1989¹⁵⁷

Key takeaways

- **The local administration of Development Minerals permitting** through the Licensing regime facilitates the processing and granting of permits, as well as promoting the involvement of local government in decision-making that will inevitably affect local

¹⁵³ See the "Introduction" for a comprehensive definition

¹⁵⁴ Government of Brazil (1967). DECRETO-LEI N° 227, DE 28 DE FEVEREIRO DE 1967. Accessed 28th September 2017. http://www.planalto.gov.br/ccivil_03/Decreto-Lei/Del0227.htm

¹⁵⁵ Government of Brazil (2017). MEDIDA PROVISÓRIA N° 790, DE 25 DE JULHO DE 2017. Accessed 28th September 2017. http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2017/Mpv/mpv790.htm

¹⁵⁶ Government of Brazil (1978). LEI N° 6.567, DE 24 DE SETEMBRO DE 1978. Accessed 28th September 2017. http://www.planalto.gov.br/ccivil_03/leis/L6567.htm

¹⁵⁷ Government of Brazil (1989). LEI N° 7.805, DE 18 DE JULHO DE 1989. Accessed 28th September 2017. http://www.planalto.gov.br/ccivil_03/leis/L7805.htm

rural and urban development rates. However, this system can give rise to arbitrary decision-making, resulting in an unpredictable and inconsistent implementation of the legal framework. Local administration can, therefore, be a successful method for regulating the Development Minerals sector, but should only be used if administered effectively and in a clear and consistent manner. Given resource constraints, this would in Uganda perhaps be best achieved through a single entity to manage both ASM generally, and the Development Minerals ASM sector.

- **The distinction between permitting for Development Minerals and Artisanal Mining permits** allow for the particular context of Development Minerals to be taken into account, whilst keeping costs and access to permits the same for both processes.
- **Brasilian Mineral Law does not take into account human rights issues** such as gender inequality or child labour, and it does not provide an adequate framework for the responsible management of ASM on LSM concessions. Although some rights issues are addressed in other legislation (e.g. the Indigenous People's Statute¹⁵⁸), it is very important to address social challenges that are particular to the mining context in mining legislation, and failure to do so can result in the widespread poor management of these issues.

Senegal

The Senegalese Mining Code has recently been amended. The sector in Senegal is regulated both by national legislation and by a regulation of the West African Economic and Monetary Union (WAEMU), of which Senegal is a member.

The Mining Sector in Senegal is administered centrally by the Ministry of the Industry and of Mines, the Mines Authorities and, in some cases, with input from regional mines departments. Senegalese Mining legislation does not use the term 'Development Minerals', however, non-metallic construction minerals that make up the majority of this report's definition of Development Minerals¹⁵⁹ are termed 'quarry minerals'. Quarry minerals include construction materials, peat, ornamental stones, materials for the ceramics industry, and agricultural minerals (excluding phosphates, nitrates and salts).

There are three different types of permits for mineral extraction in Senegal:

- Exploration and Mining permits
 - All mineral substances for utilitarian or commercial use
 - Administered centrally
- Small Mine permit
 - All minerals
 - Administered centrally

¹⁵⁸ Government of Brasil (1973). LEI N° 6.001, DE 19 DE DEZEMBRO DE 1973. Accessed 28th September 2017. http://www.planalto.gov.br/ccivil_03/leis/L6001.htm

¹⁵⁹ See the "Introduction" section for a comprehensive definition

- Granted for a maximum area of 500ha, no depth restrictions
- Semi-mechanised permit
 - All minerals
 - Administered centrally
 - Granted for a maximum area of 50ha, depth restrictions of maximum 15 metres
- Artisanal Permit
 - Administered centrally, with input from the administrative authorities and the local municipality.
 - Eligible for technical capacity building services from state
- Quarry permits
 - Quarry minerals
 - Differentiated into permanent private quarries, temporary private quarries, and public quarries
 - Administered centrally with input from administrative authorities and the local municipality

For the ASM exploitation of Development Minerals, therefore, the only option available to miners is the Artisanal or Small Mine permit, as quarry permits are necessarily large-scale.

Key legislation

- Law no 2016-32 dated 8th November 2016¹⁶⁰ enacting the Mining Code (replaced Law n°2003-36 dated 24th November 2003¹⁶¹)
- Decree n°2004-647 dated 17th May 2004 implementing the Mining Code¹⁶²
- Regulation n°18/2003/CM/WAEMU dated 22nd December 2003 enacting the WAEMU mining code¹⁶³
- La Déclaration de Politique minière, 2003

¹⁶⁰ Republic of Senegal (2016). Code Minier. Accessed 28th September 2017. [http://www.dirminigeol.sn/fichiers/Code_Minier_Loi_2016_32_DU_8_Novembre_2016\(7\).pdf](http://www.dirminigeol.sn/fichiers/Code_Minier_Loi_2016_32_DU_8_Novembre_2016(7).pdf)

¹⁶¹ Republic of Senegal (2003). Code Minier 2003. Accessed 28th September 2017. <http://www.droit-afrique.com/upload/doc/senegal/Senegal-Code-2003-minier-MAJ-2012.pdf>

¹⁶² Republic of Senegal (2004). Décret d'application du Code minier 2003. Accessed 28th September 2017. <http://www.droit-afrique.com/upload/doc/senegal/Senegal-Decret-2004-647-application-code-minier.pdf>

¹⁶³ Union Economique et Monétaire Ouest Africaine (2003). Code minier communautaire. Accessed 28th September 2017. <http://www.droit-afrique.com/upload/doc/uemoa/UEMOA-Code-minier-communautaire-2003.pdf>

Key takeaways

- **Whilst the new code requires that title holders respect the Forestry Code, the human rights of communities in areas affected by the operations and basic OSH requirements¹⁶⁴, there is not sufficient differentiation between the context of LSM, SSM and ASM with regards to these requirements.** Environmental, human rights and OHS requirements should be addressed specifically for the ASM sector.
- **The introduction of a semi-mechanised permit facilitates, in theory, the development of artisanal operations into small-scale operations** by providing a halfway house between artisanal permits and small mine permits. However, the jump in fees from 50 000 FCFA (90 USD) to 1 500 000 (2686 USD)¹⁶⁵ is prohibitively high, and may act as a barrier to the development of artisanal mines.
- **The fact that all permits are administered centrally by the Ministry of Mines** increases the likelihood of backlogs and inefficiencies into the permitting process.

India

India's mining sector is governed by the Indian Bureau of Mines (IBM) and the Directorate General of Mines Safety (DGMS). India has not adopted any formal definition of small-scale mining or artisanal mining. The term artisanal mining is not commonly used in India, and instead are considered to be forms of small-scale mining.¹⁶⁶ There are two categories that are used to differentiate mine types in India, but neither are explicitly termed as SSM. Differentiation between the two categories is done on the basis of employment and machinery, but they are not applied consistently across different states and can also be altered due to the assessment of the mine's profitability and production.¹⁶⁷ Of the eighty or more minerals that are exploited in India, about seventy of them are only extracted by small-scale mining.

In Section 7.9 of India's 2008 National Mineral Policy the Ministry of Mines expresses commitment to promoting 'small-scale mining in small deposits in a scientific and efficient manner while safeguarding vital environmental and ecological imperatives'.¹⁶⁸ It also says that the regulation of this will be tightened to control and prevent the increase of illegal mining, and that deposits that are too small to be viable for mining will be granted together in a cluster approach within a geographically defined boundary in a single lease.

Development Minerals in India are referred to as 'Minor Minerals' and managed by state governments rather than the Indian Bureau of Mines (IBM) and central government according to Section 14 and 15 of the MMRD Act '57.¹⁶⁹ Minor minerals are defined under section 3 (e) of MMRD Act '57 as 'building stones, gravel, ordinary clay, ordinary sand, limestone used for lime

¹⁶⁴ DLAPiper (2017). Senegal's New Mining Code. Accessed 2nd October 2017. <https://www.dlapiper.com/en/france/insights/publications/2017/03/senegals-new-mining-code/>

¹⁶⁵ Mining Code 2016. https://eiti.org/sites/default/files/documents/2016.11_-_code_minier_loi_2016_32_du_8_novembre_2016.pdf

¹⁶⁶ S. Chakravorty, Artisanal and Small-scale Mining in India (2001) Mining, Minerals and Sustainable Development <http://pubs.iied.org/pdfs/G00724.pdf>

¹⁶⁷ Ibid.

¹⁶⁸ Government of India National Mining Policy, 2008 (for non-fuel and non-coal minerals) https://mahadgm.gov.in/PDF/REGULATION_OF_MINERALS.pdf

¹⁶⁹ S. Chakravorty (2001)

burning, boulders, kankar, murrum, brick earth, bentonite, road metal, slate, marble, stones used for making household utensils etc., and all other minerals not defined as minor minerals in the Act are treated as 'Major Minerals'.¹⁷⁰ Officers of the IBM do not have the authority to inspect or control the activities of minor minerals or collect statistical records, which are collected by the individual State governments. This means that the amount and method of data collection is irregular between the twenty different State Governments and accurate information on these minerals is hard to determine.¹⁷¹

Three sets of rules are applicable to different regions of India for minor minerals: Maharashtra Minor Mineral Extraction (Vidarbha Region) Rules, 1966 for Vidarbha, Bombay Minor Mineral Extraction Rules, 1955 for Western Maharashtra, Konkan and the Rules Regulating Working of Minor Minerals, 1954 for Marathwada Region.¹⁷²

The types of mineral concessions that are granted for minor minerals are¹⁷³:

1. Mining lease or quarry lease:
2. Quarrying Permit:
3. Grant of Mineral Concession by way of auction

Minor mineral mines and all mines with a lease size of under 5 hectares are exempt from Environmental Impact Assessments. There are reports of minor mineral mines operating in environmentally sensitive regions which is a cause for concern but as many SSM are operating in remote areas and widely scattered the implementation of environmental restrictions on SSM is seen to be too difficult. Temporary permits for minor minerals can be granted by the State government for specific quantities of minor minerals within their jurisdiction.

Key Legislation

- Indian Mines Act 1952 (IM Act '52)¹⁷⁴
- Mines and Minerals Regulation and Development Act 1957 (MMRD Act '57)¹⁷⁵
- Mineral Concession Rules, 1960 (MCR '60)
- National Mineral Policy 2008¹⁷⁶
- Mineral Conservation and Development Rules, 1988 (MCDR)¹⁷⁷

¹⁷⁰ Gol (2008)

¹⁷¹ S. Chakravorty (2001)

¹⁷² Gol (2008)

¹⁷³ Gol (2008)

¹⁷⁴ The Mines Act of 1952 <http://indiacode.nic.in/fullact1.asp?tfnm=195235>

¹⁷⁵ Mines and Minerals (Development and Regulation) Act 1957 <http://lawmin.nic.in/ld/P-ACT/1957/A1957-67.pdf>

¹⁷⁶ Gol (2008)

¹⁷⁷ Mineral Conservation and Development Rules, 1988 <http://www.mines.rajasthan.gov.in/docs/Mineral%20Conservation%20and%20Development%20Rules,%201988.pdf>

Key Takeaways

- **Formal definitions of artisanal and small-scale mining** still do not exist in Indian law despite these types of mine representing the majority of mines in India. A lack of legal distinction between these mines mean that regulations for mines are not made appropriate to the capacity and needs of differing categories, placing disproportionate burdens on smaller mines.
- **Environmental regulations** in India do not extend to minor minerals and mines under 5 hectares but the extraction of minor minerals have caused significant environmental damage. The exemption of these categories from Environmental Impact Assessments (EIAs) could have devastating consequences for India's ecosystems and for future use of mined out land however requirements for a full EIA should be realistically balanced with the capacity of ASM. In this respect, much simpler templates or guidelines may help to bridge this gap.
- **Minor minerals regulated by different State Governments** means that there are inconsistencies between States in the collection of data and the regulations that govern them. In such a large and populous country, this may be warranted (given that Development Minerals activities and ASM, in particular, is likely to be heterogeneous between States), but overarching, key principles and rectification of gaps highlighted above coupled with the need for consistent data to inform evidence-based policy making (at State and national level) could improve governance.

Table 11: Comparative analysis of case study country regulations, according to specific criteria

Type of legal provision	Kenya	India	Brazil	Senegal
Definition of ASM	Only defined by use of technology	No formal definition of ASM or SSM	Defined by mineral and by title holder (individual or ASM cooperative)	Definition in Mining Code
Differentiation of AM and SSM	Definition distinction unclear, despite legal separation	SSM doesn't have a distinct legal definition	No distinction made	Differentiation in permitting ¹⁷⁸
Definition of Development Minerals	New legislation will regulate construction and industrial minerals (no definition provided in policy)	Defined using term 'Minor Minerals'	Defined as minerals for immediate use in civil construction	Defined as quarry minerals, especially construction materials and ornamental stones. ¹⁷⁹

¹⁷⁸ Mining Code 2003

¹⁷⁹ Ibid.

Type of legal provision	Kenya	India	Brazil	Senegal
Differentiation between Development Minerals and high-value metals and minerals	New law mentions construction and industrial minerals but doesn't specifically define them	Dealt with by State Government and in different department, but some areas of overlap in bureaus can be confusing	Different permitting processes for each	At ASM level, there is no differentiation – ASM permit covers both. ¹⁸⁰ At larger level, there are different permits for quarries, but still covered under the Mining Code.
Measures in place to formalise or regularize ASM	Draft AM strategy shows political will for rules and regulations to be easy, clear and consistent to promote formalisation	Not mentioned	Not mentioned	By way of miner ID cards, ASM zones and buying centres ¹⁸¹
Recognition of economic benefits of ASM e.g. rural development and job creation	Recognition in Mining Policy	Recognised in 2008 Mining Policy	Not mentioned	Rural development and job creation policies encourage ASM ¹⁸²
Measures to facilitate access to permits	Devolution of AM permitting evaluation to county level. Establishment of MRB	No mentions of ASM in 2016 National Policy	Dev minerals permits locally administered, and simple process	Administrative authorities are obliged to provide technical assistance to artisanal mines with regards to exploration and extraction, OHS, protection of the environment and access to permits.
Gender mainstreaming adequately addressed	Recognition that women tend to be disadvantaged in specific aspects of the mining sector	Not mentioned	Not mentioned	Not mentioned in Mining Code
Human rights frameworks espoused	Only with regards to OSH	Not mentioned	Not mentioned	Not mentioned in Mining Code
ASM/LSM conflict measures clearly articulated	Draft strategy documents demonstrate this to be a high priority.	Not mentioned	Not clearly articulated	Not mentioned in Mining Code

¹⁸⁰ Mining Code 2003, Titre V.

¹⁸¹ IGF MPF Review, 2016

¹⁸² Ibid.

Type of legal provision	Kenya	India	Brazil	Senegal
Decentralisation of permitting to local level	AM permit applications will be evaluated at the County Level. SSM and LSM permits and licenses will be evaluated centrally by MRB and authorised by CS.	Management of Minor Minerals is delegated to state government level	Decentralisation of Dev Minerals. ASM permitting partially decentralised (by establishment of central government offices in each state)	Centralised administration of ASM permits
Separate regulations on ASM/ ASM sufficiently incorporated into regulations	Draft regulations mainstream ASM, the particularities of which are given limited focus.	ASM not recognised in code	Separate regulations	ASM adequately incorporated
Size/quantity restrictions- do these make sense in the context of Development Minerals?	Size of AM and SSM permits are small. production quantity restrictions apply	Size and quantity restrictions do not make sense for some Development Minerals, there is one standard sizing and quantity measure that is universal for low and high value minerals	Maximum size is suitable for development minerals	Max sizes are suitable for Development Minerals
Allow for the improvements from ASM to SSM?	Law recognises upgrades for AM and SSM permits, but prohibits use of mechanised equipment, giving little room for improvement of practices	Doesn't recognise ASM or SSM distinctions	Not needed – ASM permits for cooperatives have no size limitations	Allows for movement from ASM and SSM to LSM, but doesn't clarify possibility of moving from ASM to SSM. Assumed possible.
Protection of Access to customary and private lands e.g. ASM zones	Provisions for AM zones established in new law. Not yet applied	Not mentioned	Limited protection. E.g. ASM is only permitted in indigenous territories when conducted by the indigenous people. ¹⁸³	ASM zones have been delineated
Occupational Safety and Health	Not addressed specifically; subject to OSH general legal provisions	Managed by the DGMS	Artisanal Mining law shows political will to promote health and safety, but does not specify how.	Mentioned in Mining Code, but not adequately addressed for ASM context

¹⁸³ Estatuto dos Povos Indígenas, art. 128

Type of legal provision	Kenya	India	Brazil	Senegal
Child Labour	Policy shows political will to address	Expression of political will to tackle	Not mentioned in Mining Policy	Not mentioned in Mining Code
Environment	Mercury and cyanide use is prohibited, as are explosives	Mentioned in Mineral Policy, without specific implementation guidelines	ASM and Development Minerals licenses need environmental permits from relevant authorities	Mining code promotes the sustainable extraction of minerals

Key Findings: Policy, Legal and Institutional Framework

Key findings derived from the analysis of the current legal framework and draft National Minerals and Mining Policy of Uganda (NMMPU) are outlined below with specific insights concerning the current and potential roles of local government. Other jurisdictions which have sought to develop suitable policy and legal frameworks for Development Minerals provide additional guidance for potential future directions for Uganda.

Key Findings from Analysis of the Current Framework and Draft Policy

The current Mining Policy (2001), Act (2003) and Regulations (2004) explicitly recognize ASM for its contribution to the economy, livelihood significance and the unique environmental, occupational and social challenges posed by the sub-sector. In accordance with this, the Government of Uganda (GoU) commits to: *“Regularize and improve artisanal and small scale mining through light-handed application of regulations, provision of information on production and marketing, provision of extension services through miners associations and implementation of awareness campaigns targeting artisanal and small scale miners”* (Minerals Policy, 2001). Since promulgation of this legislation, minerals sector stakeholders have had an opportunity to evaluate the strengths and weaknesses of the prevailing framework, including as new challenges and opportunities have emerged with the sector’s evolution.

The GoU has taken steps to address fundamental gaps with respect to Development Minerals.

Under the 1995 Constitution of Uganda, building minerals such as *“clay, murrum, sand and any stone commonly used for building or similar purposes”* were not defined as minerals and therefore constitutionally excluded from the jurisdiction of mining authorities. The GoU has recognized these shortcomings and taken steps to rectify this situation, including through constitutional amendments in 2006 that sought to distinguish extraction to meet personal needs from commercial extraction and beneficiation of these Development Minerals.

Analysis of the prevailing policy and legislation lends insight into additional opportunities and constraints for the Development Minerals sector. Specific issues relate to:¹⁸⁴

- *Ugandan legislation does not distinguish between ‘artisanal’ and ‘small-scale’ mining.* Different classifications by scale would: (i) provide a basis for entry for artisanal producers into the formal sector; (ii) recognize the diversity of work and organizational arrangements that already exist (e.g. small enterprises, community-based

¹⁸⁴ Similar conclusions have been drawn by MEMD, 2009; Hinton, 2012, and Barreto et al, 2017.

organizations, small companies); and (iii) and provide an opportunity for operators to “step up” to the next category as their operations improve and financial and technical capacity is built.

- *Investment Constraints:* Licences designated for ASM (Location Licences) are constrained to operations that do not expend over roughly \$3000 on activities, which is easily exceeded by a decent sized water pump, stone cutting machine or small jaw crusher. This provision can constraint those operations that seek to improve productivity and efficiency and invest in value addition or more environmentally and occupational responsible practices.
- *Applicable minerals.* Regulation 28(1) of the Mining Regulations (2004) provides for granting of a location licence¹⁸⁵ for *only* precious metals, gemstones, limestone, chalk, salt and brine. Despite this, DGSM has in some cases granted licences for other Development Minerals (e.g. pozzolanic ash, kaolin, dimension stones), This definition nevertheless excludes the most significant commodities in the sector in terms of employment, economic contributions and associated environmental and occupational risks.
- *Permissible licence area and duration of licence.* The maximum permissible location licence area varies depending on commodity within seven (7) categories under the licence. Based on average areas impacted for different commodities and duration of ASM activities (often in excess of 20 years), current criteria is inappropriate, in particular for ASM production of salt, clay, sand, kaolin and limestone. This is a barrier to longer-term planning and investment by current operators.
- *Bureacracy and cost.* Current requirements are too complex and costly given the socio-economic status and technical capacities of most of the ASM workforce. Given gender disparities in language, literacy and socio-economic status, women may experience greater challenges than men in this process, a situation likely to be compounded by their heavy domestic work burdens and, in some cases, lack of autonomy. This is exacerbated by the impracticable requirement for ASM miners to obtain a prospecting licence prior to a Location Licence.

Governing authorities have a clear policy mandate but a weak legal mandate with respect to ASM. The Mining Policy (2001) commits the GoU to providing extension services and other forms of support to ASM stakeholders, including through organization, training and enabling market access, among others. However, the Mining Act (2003) and Regulations (2004) detail only licencing and enforcement functions, providing little direction as to how and by whom extension service commitments shall be fulfilled. This has increased the likelihood that related workplans, activities and budgets dedicated to ASM Development Minerals (and other actors in ASM) will largely go under-funded and unfulfilled. This risk is heightened by the lack of a unit, office or department

¹⁸⁵ Under the Mining Act and Regulations, a “location licence” is granted for small-scale prospecting and mining operations which do not involve expenditure in excess of five hundred currency points (UGX 10,000,000/=) or the use of specialized technology. Because of the low investment, most small-scale mining operations are best suited for location licenses.

dedicated to ASM (as found in most other ASM jurisdictions) and inadequate attention to building financial and technical capacity of those few officers mandated to perform such functions.

Recognizing the changing context and need for updating of the current policy and legal framework, the Government of Uganda (GoU) has embarked on the process of reforms. This has thus far culminated in a draft National Mining and Minerals Policy of Uganda (NMMPU), now in its final phases of review. Following requisite approvals of the NMMPU, DGSM officials indicate that efforts are underway to expedite promulgation of a new body of minerals sector law and regulations.

Risks of an imbalanced emphasis on taxation and policing are extremely high and likely to increase as awareness of ASM Development Minerals is built. Sustained progress towards realization of Development Minerals full potential is unlikely to be achieved unless government genuinely commits to playing *both* supportive and regulatory roles in the sector. Although mining police have potential to play extremely positive roles (e.g. in terms of protection of life, legal and human rights, including in supporting access to justice for artisanal miners), current emphasis seems to be on regulating “illegal” ASM activities. A clear distinction between “illegal” ASM (which is a reality) and “informal” ASM (which likely constitutes the majority) is needed. As demonstrated in a multitude of ASM jurisdictions over the past 3 decades, “carrot-and-stick” approaches to policy and legislation are unlikely to work if only “sticks” are on offer. If no clear benefits are yielded from legality, i.e. in terms of sustained access to information, training, equipment or financing, then widespread formalization of ASM Development Minerals – and the development potential hosted therein - are likely to remain elusive.

This provides an unparalleled opportunity to support inclusive development and wealth creation from the Development Minerals sector. The draft NMMPU has discernibly shifted in its recognition of both Development Minerals and ASM and is poised to address current gaps and provide the ongoing support needed for sector development. The current Policy (and the legislation which follows) could nevertheless be strengthened by: clarifying institutional mandates and coordination arrangements; by emphasizing value chains in addition to supply chains; by recognizing risks associated with potentially marginalizing terms, such as “bona fide”; by clarifying in which case designation of ASM areas apply and, importantly, by affirming commitments to ASM extension services and ensuring accountability in workplans, budgets and monitoring and evaluation frameworks.

Key Findings Related To Local Government

As summarized above, local government engagement in ASM Development Minerals represents a major gap in the current legislation and could receive even greater attention in the draft NMMPU and the laws to come. Key findings related to local government provide a deeper understanding of potential opportunities and existing constraints.

Roles and responsibilities for the governance of the Development Minerals ASM sector beyond the Directorate of the Geological Survey and Mines (DGSM) are unclear. Although they sometimes play a role in taxation and environmental oversight, the management of the Development Minerals sector is not embedded into local government budgets or District Development plans. Local governments have expressed confusion as to their specific objectives and roles in the sector despite officers from many line ministries positioned to play supporting roles related to organization, commercialization, health and safety and others. Many call for increased coordination with DGSM.

Clarify local government mandates regarding the regulation of the Development Minerals and ASM sectors at district level, including specifying specific services and functions that will fulfil these mandates. Harmonisation between central and local government roles in the management of the sector will ensure that key functions are officially allocated to either central or local governments, increasing the likelihood that these functions will be performed. This could include the appointment of a Minerals Officer in each district, who focusses specifically on issues regarding mining and minerals. The mandated involvement of the Community-based Services department should also be considered, in order to ensure that social and community issues are taken into account.

Facilitate communication between central and local governments. This can be done in several ways, some of which include: (i) Assigning MEMD/DGSM representatives to some or all district offices, whose role would include ensuring clear channels of communication between central and local government; (ii) Holding regular meetings in Kampala or Entebbe with the purpose of disseminating important central government decision-making to local government; (iii) Ensuring that participants include those from the district offices whose role is *most relevant* to the topics being discussed; and/or strengthening links through a more formal mechanism between MEMD/DGSM Regional Offices, including in order to facilitate interaction with district offices beyond natural resources; and (iv) disseminating updated mining cadastre maps, geologic maps, production data and other relevant information, including as a precursor to more regular updating (e.g. quarterly) on changes in the cadastre and including to officers that may be more actively engaged in the sector in the future (e.g. CDOs)

Avoid over- and double taxation by central and local governments. The high levels of autonomy granted to local governments allow them agency over the collection of taxes and royalties. Robust parameters for the amounts, collection modalities and use of these taxes (e.g. with a portion allocated to services to ASM communities) should be developed in consultation with MEMD/DGSM and other sector stakeholders. Concerns about an over-emphasis on taxation cited above are equally relevant at local government levels.

Provide capacity building for local government on the Development Minerals sector, including through training and sensitisation on key issues in the sector, through the generation of thorough, reliable data on the sector in each district and through improved collaboration with central actors. In addition to the policy and laws, this should extend to technical ability of relevant officers whose capacity could be strengthened to tackle specific challenges in the sector (e.g. related to processing technologies, environmental reclamation techniques, market opportunities, lack of ASM capacity to obtain contracts for local civil works projects, etc). Upon clarification of mandates in the upcoming mining legislation, this could also include development of specific procedures and guidelines for different officers related to regulation, service delivery and with respect to planning and budgeting.

Consider implementation of a Regulatory Impact Assessment (RIA) including with a strong emphasis on gender and human rights. The implementation of a Regulatory Impact Assessment (RIA) is instrumental in evaluating how the proposed law or regulation will affect the social, economic and political interests of those impacted by it. As new draft legislation is reviewed – particularly given the tremendous development opportunities posed by Development Minerals (See section on “Profile of the Development Minerals Sector”), potential seriousness of related risks and impacts and gender inequalities found throughout the sector (See section on “Institutional and Technical Operating Context”) – an RIA is clearly warranted.

Key Findings from other jurisdictions

The following insights were obtained from the review of experiences in Kenya, Senegal, Brazil and India.

Artisanal and Small-scale Development Minerals operations should be governed by the same overarching legal and regulatory framework as other ASM activities. However, points of differentiation should be identified for this ASM sub-sector (e.g. temporary permits, obligations for post-mine transition e.g. ASM in urban areas)

A category of temporary permits for ASM Development Minerals operations should be considered in some instances (e.g. in and around expanding urban areas) as an additional category of permit to ASM permits, which are typically 2-5 years / renewable. Temporary permits would allow exploitation of industrial and construction minerals in urban areas without prejudicing in the long-term town planning and to respond to specific construction projects. Temporary permits for quarries have been used to good effect in other settings such as Brazil and Senegal. Importantly, these should not be broadly applied to certain commodities (e.g. clay, sand) as much of these activities take place outside of the urban context.

Designated ASM Development Mineral zones are unlikely to work due to the geographical spread of the activity and the proximity to major urban centres (they would become redundant when construction occurs on them and therefore serve no long-term purpose).

ASM (Development Mineral) permits should be administered at local government level. Most central government mining departments are equipped to handle a few hundred medium to large companies. The sheer number of micro-enterprises precludes effective administration of permits at the national level. Furthermore, devolved functions in Uganda relating to infrastructure that already take place at local government level, such as the construction and maintenance of roads and town planning, could be harmonised with the ASM permitting process. This harmonisation process could involve mechanisms being put in place to facilitate the use of ASM construction mineral production in public tenders.

Mining permit applications should be accessible, simple (clear and not requiring too much information) and processed rapidly. The licencing and permitting application process should take into account the general demographic of the current ASM sector, especially the Development Minerals sector. In general, educational status and literacy levels in Development Minerals communities are low, as are daily incomes. The permit application process should reflect these capacity limitations and provide sufficient support and capacity building services to those who need it. This will promote increased formalisation of the sector.

The roles and responsibilities of national and local government should be clarified inasmuch as it relates to governance of the Development Minerals sector. Functions and mandates should be agreed upon centrally and put in place locally, with adequate resources allocated to them, which would suggest establishment of revenue sharing arrangements that go beyond the self-financing approach espoused in present 1997 Local Governments Act, which has not worked in practice.¹⁸⁶

¹⁸⁶ Only 1.5% of sub-national government revenue currently comes from tax revenue. <http://www.oecd.org/regional/regional-policy/profile-Uganda.pdf>

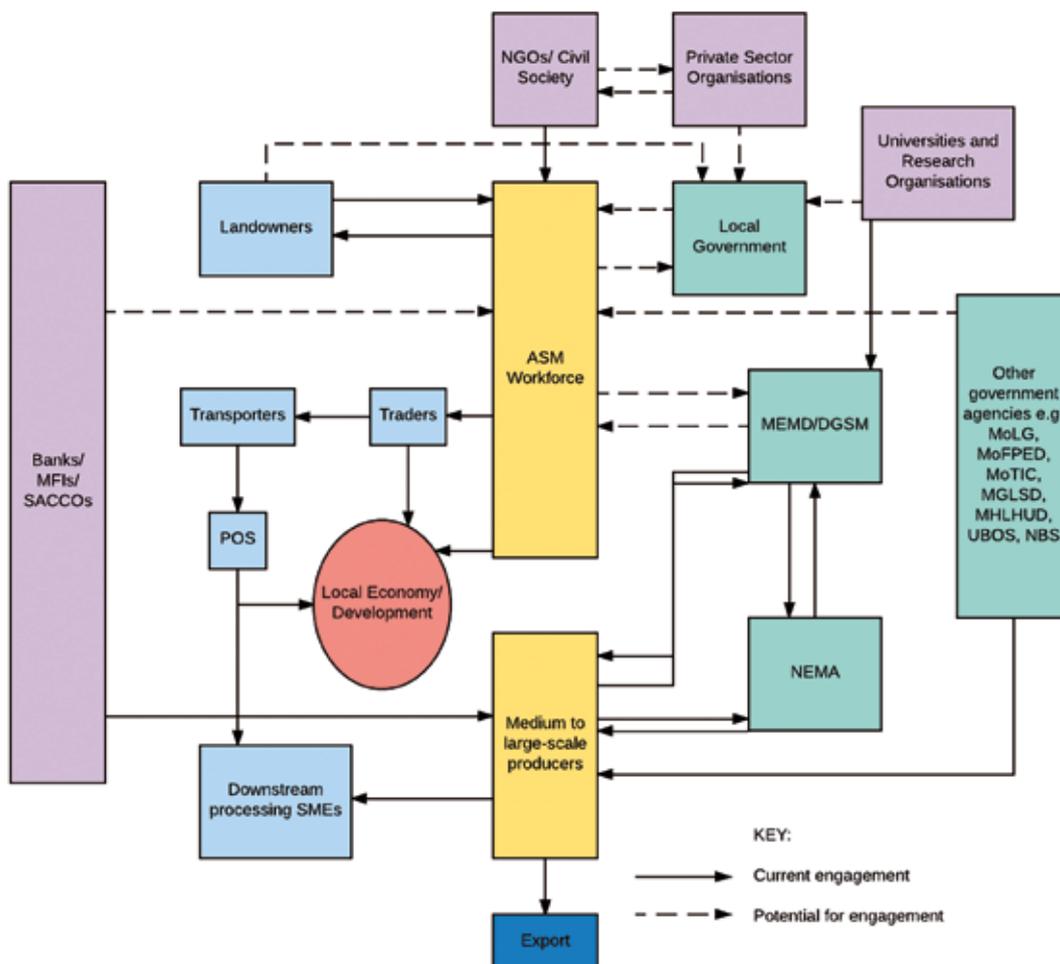
Institutional and Technical Operating Context

This review of the institutional and technical operating context of the Development Minerals sector seeks to provide insight into the structure of the sector (See section below on “Structure and Organization of the Sector”), with an emphasis on key actors, institutions, programs and strategies that are positioned to support the ASM Development Minerals sector (See sections below on Quality, Availability and Accessibility of Geodata; Sector Promotion; Financial Services; Support Services; and Research and Development).

Structure and Organization of the Sector

The ASM Development Minerals sector spans both formal and informal organisational structures in Uganda. Figure 22 shows the current and potential relationships between various key stakeholders in the sector, including the Development Minerals workforce, government bodies, private sector, NGO and research institutions and entities such as banks and finance organisations, cooperatives, and those directly involved in the local, largely informal Development Minerals supply chain.

Figure 23: Structure and Organisation of the Development Minerals sector stakeholders



Quality, Availability and Accessibility of Geodata

Geodata, also known as geospatial or georeferenced data, refers to data and information associated with geographic locations¹⁸⁷. Although this typically refers to location information provided in spatial formats (e.g. electronic or hard copy maps), given the needs and challenges concerning ASM Development Minerals, this data and information has been expanded to consider data in other formats of use (e.g. reports, assessments) about specific localities.

In the context of Development Minerals, increasing accessibility to geodata and information provides a basis to support sector development depending on the type of data involved. Useful types of geodata include:

- *Geologic, geochemical, mineralogical and geophysical geodata*: Potential uses include, but are not limited to, identification of mineral occurrences and deposits and characterization of deposits according to potential volume and value, feasibility for extraction and processing, identification of different hazards and risks and suitability for different products and uses, distance to markets.
- *Mineral and land cadastre data*: Potential uses include, but are not limited to, determining land ownership in areas of interest, availability for mineral rights licencing, identification of current licence holders as well as information on any integrated land-use planning system under implementation
- *Environmental geodata*: Potential uses include, but are not limited to, proximity to water sources, land uses, forest cover, environmental hazards and risks and climatic information, among others.
- *Population geodata*: Potential uses include population density and related proximity to markets and market size, land uses, socio-economic status among others.

With an emphasis on the types of geodata needed to improve technical practices and economic productivity, this section outlines the range of geodata providers in Uganda, the type, quality, availability and accessibility of the geodata provided and opportunities and barriers to accessibility and usability for the ASM Development Minerals workforce and other actors, such as local governments, CSOs and others, engaged in the sector.

Geodata Providers

Below are descriptions of key ministry departments, directorates and institutions where geological data can be accessed. **A table summarising the type of data that is provided by each organisation as well as their location and requirements for access is included in Annex 3.**

Directorate of the Geological Survey and Mines (DGSM)

The DGSM is comprised of three departments: Geological Survey, Mines and Geothermal Resource Departments. Main sources of data are within the geological survey department, including cartography and the library. The library, which is open to the public, contains an extensive number of documents (both published and unpublished) that range from broad reviews of the

¹⁸⁷ ISO/TC 211, 2016, Geographic information/Geomatics, https://en.wikipedia.org/wiki/ISO/TC_211_Geographic_information/Geomatics

nation's geologic potential to specific site reports on certain Development Minerals deposits. The Cartography section is charged with producing a range of different types of maps (e.g. geology, mineral occurrences) that can be purchased.

Within the Mines Department, considerable information is available on the Uganda mining cadastral portal, which is open to public and accessible at the link <http://portals.flexicadastre.com/uganda/>. The cadastre contains information that can be searched and sorted according to: the type of mineral rights (applications, exploration licenses, retention licences, location licences and mining leases), each of which can be selected for more details on mineral right owners, and the current status of licences.

Most resources are located in Entebbe, approximately 32km south of the capital city Kampala. The DGSM does have regional offices in Kabale, Mbarara, Tororo and Moroto Towns, staffed by individuals who are equipped to provide some technical guidance and direction, although they are typically not linked to the DGSM Geographic Information System (GIS) and typically do not have all geodata on-hand.

Department of Surveys and Mapping

The Department of Survey and Mapping in the Ministry of Lands, Housing and Urban Development (MLHUD), is also located in Entebbe and is charged with a number of relevant functions. This includes production of a National Atlas, a series of maps usually accompanied by textual explanations and targeted at citizens and interested foreign readers. The maps show, in detail, the natural, economic and social conditions of a country.¹⁸⁸ The Department is also responsible for establishing survey and geodetic controls (i.e., horizontal or vertical survey monuments that are primarily intended to be used as reference positions for other surveys), quality checks of cadastral jobs (e.g. relating to recording property boundaries, subdivision lines, buildings, and related details), surveys of government land and international boundaries, and production and printing of topographical maps.

The geodata available from this department also includes survey data, aerial photographs, satellite images, hard and/or electronic copies of maps and charts. Aerial photos are used to study the process of natural changes, such as variations in soil and geology over time as well as changes to the underlying ground that leads to disasters such as landslides. Survey data are used in the generation of topographic data maps, which are disseminated into the various economic sectors, where they serve as basis for socio-economic planning and land use studies, irrigation projects, water-resource development, geological exploration, transport and communication planning and management, physical planning and urban infrastructure studies.

Besides its headquarters in Kampala, the MLHUD has operational Ministry Zonal Offices (MZOs) in Mukono, Wakiso, Mbarara, Masaka, and Jinja, designed to make the MLHUD accessible to the public outside of Kampala. These MZOs operate on a computerized system, which applies to freehold, leasehold, titles and certificates of customary ownership (CCOs) The offices also incorporate functionalities for valuation assessments, physical planning and district land management decisions, and prevent encroachment on wetlands, forests, road reserves and other public land reserves.

¹⁸⁸ "Ministry of Lands, Housing & Urban Development | Department of Surveys and Mapping." Accessed October 11, 2017. <http://mlhud.go.ug/lands-management/department-of-surveys-and-mapping/>.

Ministry of Water and Environment (MWE)

The MWE, located in Luzira, Kampala, is responsible for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery. MWE has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA).¹⁸⁹ A summary of their roles and services is given below:

- **Directorate of Water Resources Management:** The DWRM is responsible for managing and developing the water resources of Uganda in an integrated and sustainable manner so that water of adequate quantity and quality is provided for the nations present and future social and economic needs. The DWRM collates the logs of well locations provided in reports by water companies which are particularly important for geological mapping.
- **Directorate of Water Development:** The DWD is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban, rural water and sanitation services, and water for production across the country. The DWD is responsible for the regulation and provision of water supply and sanitation, as well as offering capacity development support services to local government, private operators and other service providers.
- **Directorate of Environmental Affairs:** DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources. It also manages the restoration of degraded ecosystems, as well as mitigating effects of and adapting to climate change.

National Environmental Management Authority (NEMA)

The National Environment Management Authority (NEMA) is a semi-autonomous institution located in Kampala and established in May 1995 under the National Environment Act, Cap. 153. It has been fully operational since December 1995 and is the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in the country.¹⁹⁰ NEMA manages soil and land use data as well as National State of Environment Reports and (when produced in the past decade) District State of Environment Reports.

National Forestry Authority (NFA)

The NFA located in Kampala, is responsible for the sustainable management of Central Forest Reserves (CFRs), land cover mapping, supply of seed and seedlings, and provision of technical support to stakeholders in the forestry sub-sector on contract. The NFA provides topographic maps of and data on land cover and vegetation cover. These are disseminated into the various economic sectors, where they serve as basis for socio-economic planning and land use

¹⁸⁹ "MWE Structures | Ministry of Water and Environment." Accessed October 11, 2017. <http://www.mwe.go.ug/mwe/mwe-structures>.

¹⁹⁰ "NEMA Uganda | National Environment Management Authority." Accessed October 12, 2017. <http://www.nema.go.ug/aboutus/nema-uganda>.

studies, irrigation projects, water-resource development, geological exploration, transport and communication planning and management, physical planning and urban infrastructure studies.

Universities and Other Institutions

The Department of Geology and Petroleum Studies and the Department of Civil and Environmental Engineering at Makerere University in Kampala contains important geodata including key reports and books on the geology and minerals of Uganda. At the Department of Civil and Environmental Engineering has a well-established laboratory which carries out tests for different construction materials including stone aggregates and bricks.

Sector Promotion

There are various forms of sector promotion which are relevant to the ASM Development Minerals sector and its stakeholders in Uganda. These offer opportunities for raising awareness about the sector as well as building the capacity of those working with Development Minerals. This section identifies which of these forms of sector promotion have the potential to benefit the ASM Development Minerals and some of the sector promotion-specific barriers facing stakeholders who seek to access these benefits.

Tables with the details of relevant events, literature and initiatives are available in Annex 4.

Raising Awareness about the Development Minerals Sector

Current legislation places the majority of Development Minerals in the category of 'low-value minerals'. This labelling of the minerals as low-value can associate Development Minerals negatively with low profitability as a sector and marginalises them within the broader minerals sector, potentially harming the success of promotion and making them seem less appealing to investors. Changing the terminology of this legislation and grouping them around the positive impact they have on local economy according to the UNDP definition of Development Minerals could help to raise awareness and assist the re-evaluation of the minerals as attractive and rewarding investment.

Trade Fairs, Exhibitions and Networking Events

There are a number of promotional events in Uganda for ASM, LSM and SMEs that could be used to raise awareness about the Development Minerals sector, and a table of key examples has been included in Annex 4. These include events such as the government-run *Mineral Wealth Conference*, at which the ACP-EU Development Minerals Programme has sponsored a number of artisanal and small-scale miners to exhibit over the past two years. Other events include conferences, exhibitions and trade fairs organised by private companies or NGOs working in the sector. The Uganda Manufacturers Association, line ministries and civil society organisations also organise themed and issue-based conferences, meetings and dialogues. Sometimes these explicitly target ASM miners in a rural area as well as LSM at a national level, but it was noted that the majority of identified sector promotion, services and training opportunities were for all minerals without distinction or particularly those in the category of 'valuable mineral' such as gold, or oil and gas. The events were also noted to be primarily located in urban areas.

The majority of primary respondents reported that they did not participate in these sector-related promotions, events and opportunities. Some possible reasons for lack of ASM participation in these events are the following:

- **Not targeted at Development Minerals ASM:** Most of the larger events are targeted at outreach to LSM and based in urban settings, which are hard to access by the majority ASM miners in the Development Minerals Sector. Even when events target ASM stakeholders, they often focus on 'high-value' minerals such as gold, and as such are not relevant to the Development Minerals sector.
- **Lack of awareness:** ASM miners may not be informed or aware of the existence of these events, which are not promoted with ASM as their targeted audience. Lack of practical details can hinder attendance and mean that ASM miners miss these opportunities.
- **Cost of participation:** For certain events, the cost of a ticket for entry, alongside the transportation costs involved in travelling to the city to attend means that for many ASM miners they are not financially viable.
- **Do not see the benefits of attendance:** ASM miners are unlikely to be aware of the benefits that can come from attending these types of events such as networking at a national level, learning about the technology used in other areas and attracting investment. If the events do not seem to have some form of direct practical and financial benefit then ASM miners are unlikely to be interested in attending.

Information and Knowledge Products

For investors, there are a number of guide books to the Ugandan mineral sector and regions within the country such as *The Karamoja Investment Profile* and *Guide to Investing in Uganda*. **A list of key guides and their expertise has been included in Annex 5.** Different forms of practical data and information about the Development Minerals can also be found through the following government departments:

- **Directorate of Geological Survey and Mines (DGSM):** has commissioned and archives a number of sector specific studies about Uganda's mineral resources, opportunities, challenges and issues. DSGS also stores maps and geological data which can help inform decision making.
- **Uganda Investment Authority:** The SME Division (SMED) of the Uganda Investment Authority is an important source of support for SMEs in Uganda. They provide a variety of services to micro-, small- and medium-scale enterprises across the country, including entrepreneurship training, business registration for SMEs, technical skills training, business advisory, and SME mentorship programmes.
- **National Water and Sewerage Corporation and Directorate of Water Development:** for water services and environment-specific information
- **Directorate of Water Resources Management:** provides information regarding water permits.
- **National Forestry Authority:** provides information regarding central forest reserves and wood-related services.
- **Uganda Revenue Authority and Town/Municipality and City Councils:** for information on taxation and some issues related to trade licensing.

- **Uganda Registration Services Bureau (URSB):** provides services and information on business names and registration of businesses.
- **Ministry of Energy and Mineral Development (MEMD):** provides licensing services alongside the DSGM.
- **National Environmental Management Authority (NEMA):** provides information and services concerning environmental assessments.
- **Uganda National Bureau of Standards:** provides information and guidance on standards and quality issues, described in the section on “Support Services: Organizations and Associations”.

However, the literature and data available in the guides to investment or in government reports remains difficult to access by artisanal miners with low literacy levels and education, and in many cases a lack of access to internet. The Development Minerals ASM sector primarily employs local people in rural areas rather than international investors or educated Ugandans. This means that knowledge products such as guidebooks while promoting awareness of the sector to other demographics and internationally, does not best reach those that would most benefit from the information they contain. To access ASM miners, other forms of media such as radio, popular education methods (e.g. visual posters, music or drama events) might be a better form of communicating information, with the consideration given to the type of information conveyed and the format in which it is presented.

Business Incubators

While there was no established business incubation support for most of the Development Minerals, there are several business incubation initiatives operating in Uganda which could be utilised by Development Minerals sector players or used as a model for a Development Minerals-specific equivalent. These business incubators conduct entrepreneurship training on areas such as marketing, strategy, and financial and business management. They also facilitate and structure business linkages especially through linking small and medium enterprises to larger and more experienced companies.

The government has promoted the policy of microfinance as a tool of empowering micro, small and medium enterprises in offering credit facilities, and some of the incubators offer grants as seed money for acquiring machinery, renting offices and training. Business training for start-ups for young people hoping to set up businesses is also offered, which includes assistance to enable them to participate in international trade fairs and guidance on how to market and raise awareness for their products.

Departments of the government that offer a range of sector-specific business incubator services include:

- Uganda Revenue Authority,
- Ministry of Tourism, Trade and Industry,
- Ministry of Agriculture,
- Ministry of Finance, Planning and Economic Development,

- Uganda Investment Authority,
- Uganda National Bureau Of Standards,
- Uganda Export Promotion Board,
- Uganda Industrial Research Institute,
- Management Training and Advisory Centre, as well as government-affiliated business incubators, there following private sector initiatives also provide business incubator services:
- Private Sector Foundation of Uganda,
- Enterprise Uganda,
- Uganda Manufacturers Association,
- Uganda National Chamber of Commerce and Industries,
- Microfinance Institutions,
- Uganda Small Scale Industries Association

Importantly, the ACP-EU Development Minerals Programme has begun to fill this gap by undertaking a country level training series on Enterprise Skills, Market Analysis and Investment Promotion in the Development Minerals sector in Uganda. The Programme uses a training of trainers approach to strengthen the capacity of key stakeholders in the Development Minerals sector. These stakeholders range from small-scale operators/SMEs to public and private sector Business Development service providers. Participants are supported to develop business plans and the return-to-work plans to facilitate knowledge and skills transfer at community level.

Training Centres

Noting that majority of the Development Minerals sector players at ASM level are informally skilled, often with little to no formal education, vocational education and skills represent an important opportunity to support capacity development and contribute to sector efficiency, effectiveness and professionalism.

A list of training centres and vocational schools offering programs relevant to ASM Development Minerals has been included in Annex 6. Existing institutes are also supplemented by universities and institutions that teach diploma level qualifications such as Makerere, Kyambogo, Mbarara, Gulu, Soroti among others.

The government's policy on vocational institutions is to have at least one government-funded institute per region as well as multiple private centres, one example of which is the Kabale Vocational Institutes in South Western Uganda. There are vocational training services targeted at youth in Uganda, including in business administration, and financial management, however excluding some courses on mining engineering and construction, most of the training initiatives have not yet focussed on mining-specific capacity building. With respect to vocational training, most programs are limited to brick-making courses.

In countries such as Ecuador, vocational training certificates for ASM are being established in local institutions. In Rwanda, in conjunction with a public-private partnership, some companies are supporting certificates for mining in centers near to mining areas. Such a model, for instance an “ASM Certificate in Development Minerals” could make a significant impact on transforming ASM Development Minerals in the country, especially in light of the expected increase in demand for Development Minerals, driven by urbanisation, population growth and government infrastructure programmes.

Artisanal miners can also be supported by informal training run by NGOs and governments which do not provide accreditation requirements such as BTC in Northern Uganda, and the ECO in Partnership with PLA (Platform for Labour Action) project in Moroto (Karamoja), which aims at preventing child labour in the mines through education and skills development programs. In some cases, internship programs have been provided by existing businesses and large-scale mining companies which can be beneficial for capacity building. While such programs have achieved notable progress (e.g. ECO in Karamoja), the duration of projects and related funding combined with limited number of beneficiaries (given the scale of the sector) suggests the need for more institutionalized and sustained support. Under these circumstances, the lack of a dedicated ASM Unit or Department in the DGSM is particularly concerning.

Financial Services

This section outlines the types of financial services that exist in Uganda and the way that Development Minerals ASM currently engage with them.

Current Financing Options

Existing financing options available for ASM Development Minerals stakeholders include government grants and banking and micro-finance lending institutions such as PRIDE Microfinance, Opportunity Bank and more local level programs (e.g. SACCOs). One example of stakeholders using these financing options was from miners interviewed in Masaka who reported having benefited from the Youth Livelihood Fund to start a brick making business. These and other private and public arrangements can also be utilised to support the Development Minerals sector financially, particularly start-ups. **A table detailing financing options for miners has been included in Annex 7.**

Microfinance

Uganda is regarded as having one of the most successful and vibrant microfinance industries in Africa, and has experienced strong growth in the sector, with some providers now reaching as many as 45,000 clients.¹⁹¹ In Uganda, the majority of institutionalised microfinance providers are local and foreign NGOs, savings and credit cooperatives, or commercial banks. The microfinance is usually provided to small and medium sized enterprises (SMEs).

Examples of key microfinance institutions include:

¹⁹¹ A. Carlton, H Mannдорff, A. Obara, W. Reiter, E. Rhyne. Microfinance in Uganda (2001) Austrian Ministry of Foreign Affairs, Department for Development Cooperation. <http://www.oecd.org/countries/uganda/35481055.pdf>

- **Pride Microfinance Limited (PMFL):** licensed by the Bank of Uganda, the central bank and the national banking regulator, PMFL provides access to Ugandans that are unable to access financial services through Ugandan commercial banks, with a focus on micro SMEs.
- **EFC Uganda Limited:** a microfinance deposit-taking institution in Uganda which is licensed and supervised by the Bank of Uganda, the central bank and the national banking regulator, lending primarily to micro, small, and medium enterprises.
- **Letshego Microfinance Uganda:** a Tier IV microfinance institution that offers SME loans, mortgage loans, and education loans, among other forms of lending.
- **UGAFODE Microfinance Limited:** a microfinance deposit-accepting institution licensed and supervised by the Bank of Uganda, the central bank and national banking regulator
- **FINCA Uganda Limited:** a microfinance deposit-accepting institution¹⁹² licensed and supervised by the Bank of Uganda which provides financial services to Uganda's lowest-income entrepreneurs with the aim of creating jobs, building assets, and improving their standard of living

Of the financing options potentially available to the ASM Development Minerals sector in Uganda, the following were identified as most important for consideration in the provision of support to the sector and have been described below:

1. Rural SPEED (USAID)¹⁹²

The Rural Savings Promotion and Enhancement of Enterprise Development (Rural SPEED) program was launched by USAID in 2004 to stimulate economic growth and increase wealth by expanding access to financial services in Uganda's rural areas. The focus of Rural SPEED's work has been to connect market-oriented farmers and rural businesses to financial institutions. The program provides technical assistance and grants to financial institutions including commercial banks, finance providers and village-level SACCOs. It also supports training and mentoring and public awareness efforts. Rural SPEED has facilitated the opening of 300,000 new savings accounts to expand farming operations and other small businesses.

2. Opportunity Uganda¹⁹³

Opportunity Uganda works to provide financial services to those living in chronic poverty. Examples of this include farmers loans to help farmers pay expenses during the growing seasons, and offering personal and fixed deposit accounts. Some of its initiatives include:

- **ExtraSave:** encourages clients to deposit money monthly and accumulate savings,

¹⁹² Improving Access to Financial Services in Rural Uganda: Rural SPEED Final Report. (2007) USAID http://pdf.usaid.gov/pdf_docs/pdaci993.pdf

¹⁹³ "Opportunity Uganda." Opportunity International. Accessed October 12, 2017. [//opportunity.org/what-we-do/where-we-work/uganda-facts-about-poverty](http://opportunity.org/what-we-do/where-we-work/uganda-facts-about-poverty).

- **AgroSave:** incorporates insurance coverage into farmer savings accounts.
- **EduSave:** an insurance-linked education-specific savings product developed with insurance subsidiary MicroEnsure which helps children continue to pay tuition in the event they lose their family income through a parent's death or disability.
- **Home Improvement Loans:** provide home improvement financing, housing support services and technical construction assistance to impoverished people in Uganda.
- **Solar Panel Loans:** covers solar panels and installation (approximately US\$300), to bring light to families living without electricity. The energy the panels absorb from the sun helps families efficiently light their homes and businesses so they can extend their hours of income- or school-based productivity.

3. Savings and Cooperative Credit Organizations (SACCOs)¹⁹⁴

SACCOs are one of the various types of co-operative structures that exist in Uganda. With a focus on promoting the economic interests of their members, SACCOs mobilise and intermediate savings for their membership. Categorised as micro-finance institutions, SACCOs are distinct to many other MFIs in that they are community membership-based organisations, meaning their owners are also the sole users of the services they offer. Whilst SACCOs are not without their challenges, with claims that they are often mismanaged by their members, they have significant potential for positive impact in that they provide access to finance for the (mostly) rural poor in Uganda where formal financial institutions cannot.

4. Village Savings and Loan Association¹⁹⁵

The Village Savings and Loan Association (VSLA) is a successful micro-finance model under the NGO CARE and a number of other NGOs throughout the country, which forms savings groups at a community level to reduce poverty in order to financially and socially empower poor and vulnerable people in Uganda. A VSLA is a self-managed group that does not receive any external funding; it provides its members a safe place to save their money, to access loans and to obtain emergency insurance.

Relevance to the ASM Development Minerals sector

Although these organisations are not directly targeted at the Development Minerals sector, most of these institutions service needs that are relevant to Development Minerals stakeholders, such as increasing access to formal financial institutions, training of SMEs to understand how they can benefit, and providing grants to facilitate start-ups. Working through these organisations or using them as models for Development Minerals-specific support services provides a foundation for engagement with miners. The success of microfinance institutions in Uganda suggests that there is a lot of potential to engage using these systems, and that they have already established

¹⁹⁴ Uganda Co-Operative Savings and Credit Union Ltd. FAQs. Accessed 23rd November 2017. <https://ucscu.coop/index.php/faqss>; Senyoni, Taddewo (2013). The CEO Magazine. Are SACCOs really transforming poor Ugandans? Accessed 23rd November 2017. <http://www.theceomagazine-ug.com/blog/2013/08/20/are-saccos-really-transforming-poor-ugandans/>

¹⁹⁵ Care Uganda "Village Savings and Loan Association" Accessed October 12, 2017. <https://www.care.org.au/wp-content/uploads/2014/12/CARE-VSLA-Report-Uganda-Eco-Devel.pdf>

a strong reputation country-wide. However, if similar systems are to be used to support the ASM Development Minerals sector, challenges such as its informality and unpredictability must be taken into account to ensure successful interventions.

ASM Engagement with Financial Services

Effective access to financial services are a necessary component for growth of the Development Minerals sector. However, field research indicates that the majority of ASM miners did not receive any financial support from institutions, but rather from informal relationships with individuals or groups. A few miners reported having received a small personal loan to invest in their businesses or mining with the majority borrowing from friends or individuals other than known financial institutions.

Miners consulted indicated fear and uncertainty to approaching or borrowing from most these interest-based institutions. The unpredictability of the ASM sector and the lack of collateral means that they do not feel safe working with formal financial institutions, and feel that they will not be able to comply with the standards that are required. Sales in ASM are not consistent, earnings are often delayed, financial returns can be low and there is limited land ownership among the miners themselves of the sites that they mine. More flexible financial services that are accommodating to the realities of ASM would perhaps make it a viable option for more miners. For the Development Minerals sector, a tailored approach to mineral ownership rights is also needed to help engage miners, with provisions to recognise that most miners work in quarries or mines that are rented rather than owned. Awareness raising among miners about how to engage with these types of institutions would also be a necessary requirement to gain the confidence and trust of miners that who are unfamiliar with these types of financial operation.

Gender-Specific Barriers

A number of gender inequalities are found in the Development Minerals sector, ranging from inequalities in distribution of benefits (e.g. jobs, incomes) and negative impacts (e.g. of environmental degradation and occupational disease), With respect to finance, gender-specific barriers have been well-documented and analyzed for Uganda's rural poor, most of which also apply to ASM Development Minerals.

Main issues relate to harmful gender norms, including those which impede the autonomy of women. For instance, in multiple ASM communities in Uganda, a study in 2008 found that many women require permission from their spouses in order to join a women's association, visit a medical clinic, take a job and even visit their own relatives¹⁹⁶. Such norms impede can impede women from joining SACCOs, VSLAs and consulting with banks and microfinance institutions. Time poverty of women is acute, a constraint that can be compounded further if women need permission to socialize with others, both of which can restrict opportunities to become aware of the existence of financing programs and effectively participate in them. Access can be further impeded by disparities in education and literacy rates, limited opportunities (due to socialization

¹⁹⁶ MEMD, (2009b). *Guidance Strategy for Promotion of Gender Equity in the Minerals Sector*. Ministry of Energy and Mineral Development (MEMD), Republic of Uganda. Entebbe (UG).

since girlhood) to build confidence needed to approach institutions and the need for approval of husbands in how women's incomes are used, therefore affecting their ability to save.¹⁹⁷

Although such barriers are likely to extend to the ASM Development Minerals sector, given levels of economic diversification (See section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: ASM and Livelihood Diversification"), women's contribution in ASM may in some ways increase their autonomy and counter such norms. For instance, some research has indicated that women's incomes from ASM may improve the status and decision-making power of women within households,¹⁹⁸ while other work indicates that women are likely to have more control over incomes yielded from non-farm employment¹⁹⁹. Nevertheless, as a "baseline", women's incomes from ASM are, on average, over 30% less than those of men. Research in two ASM communities in Uganda, where proportions of married women were similar to that found herein (66%), it was found that 65% and 44% of women in the two communities were the "major contributors to household expenses"²⁰⁰. As a consequence, women may have less surplus income than men to engage in savings programs.

Relates impacts of the above conditions extend to women's capacity to participate in forums, networking events, exhibitions and capacity building opportunities, factors which contribute to the low visibility of women's work in the sector overall. Furthermore, women and young people tend to lack the financial collateral needed to secure loans or grants, such as ownership of land or mines which are needed to request particular forms of support. For example, the Youth Livelihood Fund requires a recommendation and evidence that the loan or fund can be recovered, which women in particular struggle to obtain. Financial institutions and support programs (e.g. SACCOs, VSLAs) will necessarily need to account for specific challenges faced by most vulnerable actors in the ASM sector, including youth, least educated and most disenfranchised members of the workforce. As suggested herein, women within these groups, in particular, face considerable barriers to financial access that, considering their relatively high rates of participation in the sector, must be overcome in order to realize the sectors full development potential.

Support Services

This baseline study has confirmed that informal and formal small associations for miners and mining groups are present in Uganda. These are usually the result of government or other organisations facilitating their creation, or established by miners who were forced to work together in order to resolve a specific challenge that united them. However, most of the existing associations are focused on non-Development Minerals such as gold. A table of relevant existing organisations and associations operating in Uganda can be found in Annex 8.

¹⁹⁷ FAO/IFAD (2000) IFAD's Gender Strengthening Programme for East and Southern Africa – Uganda Field Diagnostic Study. Accessed 4th October 2017. <https://www.ifad.org/documents/10180/e866d629-8693-44d8-b01a-3481ab9b26f2>.

¹⁹⁸ Hinton (2017)

¹⁹⁹ FAO (2000)

²⁰⁰ DRASPAC (2017) National Dissemination Seminar on the GROW Women and Artisanal Mining in East and Central Africa Project, Nov. 22, 2017

Organizations and Associations

Most associations are composed of many groups or individuals and span a wider geographical coverage acting as umbrella associations, which help to link together smaller, site-specific or informal groups. Examples include the Singo Artisanal and Small-scale Miners Association (SASMA), Mubende Gold Miners Association, Kitumbi-Kayonza Miners Association Limited (focused on gold mining), Karamoja Miners Organisation, Karamoja Mineral Watch Platform (focused on limestone, marble, and gold), Kigezi Miners Association, and Namulanda Artisanal Mining Association. Some associations are registered as limited companies, others as non-governmental or not-for-profit organisations, and advocacy groups are also present in the sector such as the Uganda Miners Association and the Uganda Chamber of Mines and Petroleum. Although a national federation of ASM Development Minerals could provide an invaluable platform for lobbying and advocacy, the nearest equivalent, the National Artisanal and Small-Scale Miners Association of Uganda (NASMA) has been largely inactive.

All of these association seek to advance the interests of the mining sector, protection of miners' rights and formation of a collective bargaining force. There is a notable absence of focus on Development Minerals miners and related ASM with much less participation by members of the sector, but the success of these ASM associations for other minerals such as gold suggest that there is potential for similar initiatives to be workable in the Development Minerals ASM sector as well.

Our research shows that the majority of Development Mineral ASM miners are still acting independently without connection to an association. Reasons noted for this were:

- High informality within the sector,
- High turnover of workers and miners, as many are in the mining business as an initial way of gaining funds to pursue other economic activities,
- Limited ownership and rights regarding the mining areas and deposits,
- Mistrust among miners leading to reluctance to collaborate with one another,
- Lack of perceived common actions and ambitions or benefits to work within associations and report to each other.

Workers' Rights Advocacy

The ASM sector in Uganda is characterised by self-employment and casual labourers with little to no contractual arrangements or legal rights. This is also common practice in SMEs and a lot of other rural work, and workers are not well protected by Ugandan legislation, which has no minimum wage policy or law, leaving wages to the discretion of the employer. Some disregard of workers rights in the workplace that were observed can be attributed to ignorance of laws including the 2006 Employment Act and 2006 Occupational Safety and Health Act that many sites failed to adhere to. Our findings are supported by the study *Employment Policies for Uganda: Young Leaders Perspectives*, which also noted failure to comply with this legislation.²⁰¹ Furthermore, as

²⁰¹ KAS (2011). *Employment Policies for Uganda: Young Leaders' Perspectives*. Accessed 5th November 2017. http://www.kas.de/wf/doc/kas_29797-1522-2-30.pdf?111221152359

detailed in the section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Artisanal and Small-scale Mining Businesses”, most ASM mineworkers do not work as employees under a company (or even a cooperative). This lack of organizational structure and lack of laws protecting informal workers represents a major gap in the sector.

In terms of stability of wages, the Development Minerals sector is not prone to mineral sector price fluctuations in the same way as the precious metals and stones sector, for example. This, in theory, makes for a relatively stable and reliable income for its stakeholders. However, in reality, ASM wages are usually paid according to time worked or quantity of product extracted. Thus, the seasonal nature of the occupation coupled with informal work arrangements and inequality in the distribution of revenues (e.g. with mine “owners” and, in some cases, landowners) can leave miners vulnerable to irregular pay. This contributes to miners remaining stuck in a cycle of poverty and unable to rely on a sustained income. It also means that many miners will seek alternative employment alongside mining to supplement their income and provide greater stability.

These issues have yet to be properly addressed by associations and organisations in Uganda, which are currently more focused on sector governance, legal regimes, formalisation, prices of mineral product and business development. Occupational safety and health (OSH) is viewed as an area of concern but minimal action has been taken to date. The advancement of workers’ rights in the mining sector is also inhibited by miners having very limited knowledge and awareness of their rights, sector economics and (as of yet, unclear) benefits of legal status. The informality of the sector and the low education of most of its members further perpetuates this by making information difficult for miners to access **and understand and utilise**. New programs on workers’ rights in the Development Minerals sector must be mindful of these limitations.

Verification of Product Quality

A rapidly **increasing priority for** Development Minerals producers and consumers in **Uganda** involves the verification of the quality of Development Minerals products, mainly through analysis and testing to determine compliance with national standards. This is **particularly** true within the construction sector where sub-par quality of building materials has serious implications for durability of products (e.g. road works), safety (e.g. structural integrity of concrete) and future maintenance costs.

The National Bureau of Standards (NBS) therefore provides a number of standards of relevance to ASM Development Minerals (Table 12). Furthermore, laboratory services to verify compliance with standards of relevant products are available through NBS with other analytical services (e.g. provided by the Central Materials Laboratory). A survey of the types and status of different analytical and testing equipment in these labs, as well as costs for testing services are outlined in Annex 9.

Table 12: National Standards Relevant to Development Minerals (Source: National Bureau of Standards, 2017).

No.	Standard ID	Description	Price (UGX)
1	US 101:2002	<i>Stone Aggregates</i> : Quality and grading requirements for aggregates obtained by processing natural materials for use in concrete.	25,000
2	US 102:1995	<i>Burnt Bricks</i> : Requirements for dimensions, compressive strength, water absorption, efflorescence and sampling of burnt bricks made from clay, brick earth or shale, for use in walling. It also gives methods for classification.	25,000
3	US 816:2008	<i>Clay roofing tiles and ridges</i> intended for use as roof coverings . Durability and appearance and a weather-resistant surface of specified design are required.	35,000
4	US ISO 5019-1:1984,	<i>Part 1: Rectangular bricks</i> : Dimensions of two series of rectangular refractory bricks. (may be used in conjunction with US ISO 5019-2)	40,000
5	US ISO 5019-2:1984,	<i>Part 2: Arch bricks</i> . Dimensions of two series of refractory arch bricks, each with a constant median dimension and one series of refractory arch bricks with a constant backface dimension (may be used with US ISO 5019-1)	40,000
6	US ISO 5019-3:1984,	<i>Part 3: Rectangular checker bricks</i> : Dimensions of rectangular checker bricks for regenerative furnaces.	40,000
7	US ISO 5019-4:1988,	<i>Part 4: Dome bricks for electric arc furnace roofs</i> : Dimensions of refractory bricks for use in the domes of electric arc furnace roofs. The dimensions of special bricks also used for the construction of these furnaces are given for information only.	40,000
8	US ISO 5019-5:1984,	<i>Part 5: Skewbacks</i> : Dimensions of two skewbacks, one for use with bricks of a course height 64 mm and one for use with bricks of a course height 76 mm.	40,000
9	US ISO 5019-6:2005,	<i>Part 6: Basic bricks for oxygen steel-making converters</i> : Dimensions of basic refractory bricks for use in oxygen steel-making converters	40,000
10	US ISO 5417:1986	<i>Dimensions of basic, fireclay and high alumina refractory bricks</i> for use in rotary kilns. It does not apply to special closure bricks for use in completing circles.	40,000
11	US 970-1:2012 Part 1: Terminology	<i>Agglomerated stone-slabs and cut-to-size product</i> : The terminology and classification of the agglomerated stone products	25,000
12	US 970-2:201 Part 2: Product requirements	<i>Agglomerated stone-slabs and cut-to-size product</i> : Requirements for slabs and cut-to-size product of agglomerated stone which are made for use as vanity, kitchen tops and other similar uses in furnishing and modular tiles of agglomerated stone which are made for use as flooring and stairs for internal and external uses, fixed by mortar or adhesives	30,000
13	US 288:2000	<i>Quick limes and slaked limes</i> : Covers three types: calcium, magnesium and dolomitic, for use in soil stabilization and produced by calcining of limestone or calcium carbide treatment.	20,000
14	US 289:2001	<i>Limestone</i> : Requirements for the quality of limestone of various grades (including seashells and calcite).	20,000

Major issues relate to the capacity of ASM operators to obtain and comply with current standards. All major institutions that provide the standards and laboratory services are located in Kampala. The procedure for obtaining even a copy of the standard requires sufficient capacity to navigate the internet, including both the UNBS and the Uganda Revenue Authority (URA) websites, users must have a tax number and must present resulting receipts in person at UNBS. Furthermore, the standards are highly technical and difficult for non-engineers or geoscientists to understand. Compliance testing requires payment on the order of 5,000 UGX to over 300,000 UGX per analytical method and typically multiple analysis are needed to meet a given standard. Different batches of product often also require at least a minimum number of analysis.



Figure 24: Materials to be tested at CML



Figure 25: Odometer cells used at CML



Figure 26: Stock tanks for curing concrete at CML

When taken together, this amounts to a major hurdle for smaller Development Minerals producers who are aiming to reach higher end markets (e.g. through packaging and marketing of certain products such as bagged lime) and obtain and maintain larger contracts (e.g. public civil works projects). This challenge is compounded as multiple and periodic (e.g. per batch) analysis and certification is often required to verify ongoing compliance.

Research and Development

Uganda's mineral sector has been described in many studies, with research including technical, geological and socio-economic focuses as well as broad national sector reviews. **A comprehensive summary of important research projects and publications concerning Uganda's Development Minerals sector is provided in Annex 10.**²⁰²

Although a range of topics have been covered, different minerals tend to have attracted attention for a specific type of research. For example certain minerals have a wealth of technical research on their applications due to their investment potential, but perhaps lack analysis on their sustainable mining practices (e.g. characteristics of certain sand deposits). The variety of Development Minerals, their distinctive traits and the lack of interest they have attracted in comparison to other minerals such as gold, means that there are still major gaps in knowledge that merit deeper research and attention.

As described in the above section on "Institutional and Technical Operating Context: Structure and Organization of the Sector", a multitude of research is housed in the DGSM Geodata Center and Library in Entebbe. A large proportion of country-specific work is scanned, digitized and was

²⁰² Please note that some studies conducted by DGSM on sand have not been included as they are not currently available for access.

previously available through an on-line searchable database (now off-line). The library at Makerere University also provides an abundance of research, including dissertations and theses produced by the Department of Geology and other departments. These repositories include both recent research and considerable archived researched.

Current and Recent Research

Some of the research underway or conducted over the past two decades is listed in Annex 10 and summarized as follows:

- A number of **country-wide reviews** outline known industrial and construction minerals occurrences and production sites around Uganda and provide useful insights into the localities currently being exploited, those warranting investigation for potential exploitation, the current actors in the sector and main challenges facing sector development. This includes work by Nyakecho (2016), Yager (2016), Katto (1997) and, specific to dimensions stones, work by Kato (undated), among a number of others.
- Some research on **technological methods** has been done on how to improve the production processes of certain Development Minerals while others focus on **technical characteristics** (e.g. mineralogy, geochemistry) as needed to determine suitability for different uses and appropriate processing methods. This includes work by Kayamba and Kwesiga(2017), Niwamara et.al(2016) and Olupot (2006). Most work relates to the clay sector, which provides specific guidance on recommended innovations and modifications in kiln construction, moulding and other facets of production with a view towards reducing fuelwood consumption. Ongoing research by the ELITH project by The Faculty of the Built Environment, Uganda Martyrs University and Warwick University has led to a range of useful publications with particular relevance to clay but spanning technical, economic and social spheres. Some work has been done assessing the suitability of different clays in the Kampala region for porcelain production while others have focused on the use of pozzolanic ash in cement production. Some of this locality-specific work, in particular, can provide some guidance for future investment.
- **Sustainable development and socio-economic dimensions** have been studied in a growing number of studies, much of which focus on limestone, marble and gold in the Karamoja Sub-region. Areas of emphasis range from gender and livelihoods to conflict to human rights. Notable exceptions include work by Birabwa (2006) on stone quarries in Mukono and an assessment of economic implications of wetland conversion to local people's livelihoods by Wasswa et al (2013).

Limitations of Research and Development

The body of research is limited, however, thorough investigation of archives, particularly at DGSM, Entebbe, would undoubtedly yield greater insight. The main limitations of work described above include the following:

- **Emphasis on certain regions or commodities:** With respect to socio-economic assessments, the majority of studies have focused on Karamoja sub-region or, to a lesser extent, in and around Kampala, with other regions being neglected. In terms

of technical research, clay and to some extent pozzolanic ash, have received the greatest attention. The environmental impact and production processes of clay brick production has been analysed to a much greater degree than the production processes of other Development Minerals. In addition to pointing to significant gaps in the research, this means that the understanding the sector as a whole can be skewed towards certain regions or commodities.

- **Research is often directly centred around a limited number of investment opportunities.** Research on some minerals is focused around certain deposits or areas of occurrences and specific use of the mineral such as the work done by Naigaga et. Al (2015) and Nshekanabo et al (2015) that examines the potential use of pozzolana in Portland concrete and cement. As captured in the many multi-site reviews of mineral occurrences, most sites have lacked such in-depth scrutiny providing a gap for current producers (e.g. ASM operators) or future investors into the sector.
- **An important knowledge gap relates to value addition opportunities for artisanally-mined Development Minerals.** The exception to this is a multitude of work undertaken on clay that provides specific guidance on means to optimize production processes and reduce fuelwood consumption. For most other ASM Development Minerals, the lack of research on value added opportunities – particularly with respect to the need for low-cost, intermediate and appropriate technologies for ASM – represents a major impediment to advancement of the sector.

With respect to the technical gaps in research and development, in addition to potential collaboration with the work under the ELITH project by Warwick University and Uganda Martyr's University (with respect to clay), research and development on suitable technologies and methods could be undertaken with institutions such as Makerere University, College of Engineering, Design, Art and Technology; Busitema University, Faculty of Mining Engineering and the DGSM Mineral Dressing Laboratory in Entebbe. Such efforts may benefit through collaboration with other African institutions, such as SEAMIC in Tanzania and MINTEK in South Africa, where work in this area has been done.

Finally, while the research cited above provides a useful foundation, much of this work is highly technical and out of reach of most ASM Development Minerals producers. Among different knowledge products developed by the ACP-EU Development Minerals Programme, some outputs could consolidate and simplify key findings or guidance that is available in-country (e.g. concerning improved brick production processes) and fill specific gaps by drawing from international work on low-cost, appropriate, intermediate ASM technologies (e.g. related to small scale dimension stone cutting techniques).

Key Findings: Institutional and Technical Operating Context

An abundance of geodata exists but it is out of reach of most engaged in the sector. The Directorate of the Geological Survey and Mines (DGSM) in particular houses a phenomenal data set. Potential uses include, but are not limited to, identification of mineral occurrences and deposits and characterization of deposits according to potential volume and value, feasibility for extraction and processing, identification of different hazards and risks and suitability for different products and uses, distance to markets. These knowledge products are largely out of reach from most in

the Development Minerals sector in terms of both distance (most is centralized in Entebbe) and financial and technical capacity to fully utilize them.

Countless sector promotion opportunities exist but most of these are unaware of or do not prioritize Development Minerals. These include a range of trade fairs, networking opportunities, business opportunities and training and related SME support services. These largely are not targeted towards ASM Development Minerals, a factor which may be a consequence of the sector's inaccurate classification as "low value" and lack of awareness by both economic actors in ASM Development Minerals value chains and program proponents. While, this is slowly starting to change in relation to the attention accorded to the sector during the 2017 edition of the Mineral Wealth Conference, much more needs to be done to bring the sector to the forefront. Addressing capacity gaps of miners and other economic actors in the value chain, particularly with respect to cost, time and the need to ensure such events are of direct benefit requires greater attention.

Uganda has a thriving microfinance industry and larger banks show interest in the sector but most ASM mineworkers do not have the qualifications to be eligible for formal financial services. Main issues relate to lack of ownership of land or other collateral, lack for formal production records and, in many cases, lack of bank accounts. This is compounded by exceptionally high interest rates, suspicion and reluctance of ASM miners to engage with formal banking systems and lack of awareness of opportunities for the rural poor to address gaps in know-how. In many cases, SACCOs and VSLAs may provide a more appropriate mechanism for delivery of services and a stepping stone to other forms of financing in the future. Specific gaps facing women, including those concerning autonomy to access and make decisions about how financing is used, should be integrated within related training activities.

A range of support services, from private sector associations to workers' rights advocacy groups and NGOs are positioned to support economic actors involved in ASM Development Minerals. Despite this, most active associations exist to support larger private sector actors (e.g. the Uganda Chamber of Miners and Petroleum) or are focused on higher profile commodities (e.g. ASM gold). Labour organizations work largely outside of the minerals sector and, particularly in the case of ASM, very few workers are on contract or formally working, thus application of labour legislation and related workers' rights frameworks has been extremely limited.

Major issues pertain to capacity of ASM operators to obtain and comply with national standards. In order to access a wider market and successfully bid for and win contracts for larger projects (e.g. supply of bricks or stone aggregate to district government civil works projects), ASM operators must meet certain standards for quality as specified by the National Bureau of Standards. A number of barriers exist. All major institutions that provide the standards and laboratory services are located in Kampala, the procedure for obtaining even a copy of the standard is complex and costly, the standards are highly technical and difficult for non-engineers or geoscientists to understand and compliance analysis and testing (also located in Kampala) can be costly, particular where multiple and period analysis is required.

Research and Development activities provide an important opportunity to deepen understanding and identify technical solutions to many of the sectors challenges. Considerable research has been conducted on specific regions (e.g. Karamoja), topics or commodities (e.g. environmental impacts of clay brick production, mineralogy of clays) but major gaps exist. A number of sector-wide reviews provide insight into the distribution and nature of known deposits, but research is needed, in particular, concerning value addition opportunities and technical measures (i.e. ASM appropriate technologies) that will be essential to boosting the sector's potential.

Environmental, Occupational And Social Impact Analysis

This section describes and assesses the main environmental, occupational and social impacts of ASM Development Minerals production in Uganda and those management measures currently being employed by sector operators. Mineral, regional and in some cases local differences in terms of significance and severity of impacts are characterized, providing a basis to prioritize mitigation measures that can underpin and provide specificity to the recommendations put forward to the Government of Uganda, the ACP-EU Development Minerals Programme and other sector stakeholders.

Analytical Approach

Although the nature of many impacts is somewhat similar for different target commodities, the severity and extent of many impacts can drastically differ. This is attributed to a range of factors. First, mineral commodities produced differ in terms of production methods, volumes of waste and production, rates of production, workforce characteristics, product diversity, value and use and distance to and nature of markets. Second, every ASM site differs in terms of ecosystem features, including hydrology and hydrogeology, geologic conditions, soils characteristics and topography. Finally, this is further complicated by variability in density, culture, history, land uses and economy of host populations and heterogeneity within them, including with respect to socio-economic status and vulnerability of certain groups and variations in gender norms, beliefs and values.

Each subsection (environmental, occupational and social impacts) therefore seeks to identify critical impacts and then contextualize them within local conditions. Given limited data on certain impacts (e.g. lack of clinical diagnosis in the case of OSH), some potential impacts are described in the context of prevailing conditions and expected levels of risk.

Mainstreaming Gender within the Analysis

Given that environmental, occupational, social and economic impacts can have implications for gender equality, the analytical approach accounts for gender within the analysis.²⁰³ This is because certain impacts may be less evident or obscured if a gender lens is not used. For example, erosion from stone quarries may negatively impact watercourses, impacting downstream water users by affecting quality and/or quantity of water. In many localities, women, girls and boys are primarily responsible for water collected to meet household needs. Thus, this impact may require water collection from more distant sources, potentially impacting work burdens, time available for income generating and other activities (or schooling in the case of children), thereby increasing the susceptibility to poverty of affected groups. The analytical approach, therefore, seeks to account for gender throughout, results of which supplement the more comprehensive gender analysis presented in the below section on “Environmental, Occupational and Social Impact Analysis: Key Findings: Environmental, Occupational and Social Impacts”.

²⁰³ The approach to gender integration draws heavily from the Partnership Africa Canada (PAC) Gender Impact Assessment Tool for ASM Technical Assistance and Formalization Projects, that is currently being developed and piloted. Additional methodological guidance can be found in Hinton (2017), due for dissemination in November, 2017.

Environmental Impacts and Management Measures

Key environmental issues are outlined in the following section, and are arranged according to the main components of an ecosystem (land, water, air, biota) taking into account commodity and regional differences. Given the potential implications of climate change on current and future environmental, social, human health and economic wellbeing, special emphasis is placed on climate change adaptation and resilience and existing mitigation and management measures are outlined in the below sections.

Ecosystem Impacts

Mining of any commodity can result in a range of impacts at the site-level and in many cases beyond, including via indirect impacts on other ecosystem components, such as through land degradation affecting downstream water courses, human health and other economic activities. This is examined in the context of main ecosystem compartments: land, water, atmosphere and biota, including related impacts on human populations.

Terrestrial Resources

Uganda has a total area of 241,550 sq. km, of which 71.9% is arable, 10.4% is forests and 10.9% is covered by wetlands.^{204,205} Approximately 85% of the population lives in rural areas and farming provides a source of livelihood for 65%²⁰⁶ of Uganda's labour force, 58% and 70% of whom are men and women, respectively²⁰⁷. In 2016, agriculture constituted 26% of the GDP²⁰⁸.

As such, main issues related to ASM production of Development Minerals therefore concern impacts on agricultural lands, although land disturbances affecting other land uses (e.g. human settlements) are also addressed.

Land Area Impacted

In total, ASM Development Minerals extraction in Uganda is estimated to directly impact approximately 515 km², or approximately 0.3% of the country's total land area. Although this is well below the 41% of Uganda's land that is currently being cultivated, Development Minerals can have additional indirect impacts on the quality and quantity of arable land, as described further below.

²⁰⁴ World Bank (2011) and UBOS (2012) cited in: Caffrey, P., Finan, T. et al. (2013). Uganda Climate Change Vulnerability Assessment, USAID Report, 78p.

²⁰⁵ NEMA (2016). National State of the Environment Report for Uganda 2014, National Environment Management Authority (NEMA), Kampala.

²⁰⁶ UBOS (2017).

²⁰⁷ UN Data. Uganda: Country Profile. Accessed October 1st, 2017. <http://data.un.org/CountryProfile.aspx?crName=Uganda>

²⁰⁸ Deloitte (2016)

Table 13: Area of Land Impacted by Commodity

Commodity	Total Est. Area Impacted (km ²) ¹	Ave. area per 100 persons (hectares/100p) ¹	Comments
Clay and Clay Bricks ¹	45 km ²	2.3 ha/100 p	Primarily in or on margins of wetlands. Sometimes forested or densely vegetated (e.g. papyrus).
Sand ¹	176 km ²	6.9 ha/100 p	In or on margins of wetlands (as above); lake shores, including fish breeding grounds.
Stone Aggregate ¹	152 km ²	0.09 ha/100 p	Near surface. Often on ridges and hillslopes. Sometimes in forests, often grazing land. All geoclimatic zones.
Dimension Stones ¹	27 km ²	0.09 ha/100 p	Often produced with stone aggregate (above); some additional deposits (mudstone, siltstone). Near surface deposits. All geoclimatic zones.
Limestone and Marble	n/a	n/a	Near surface deposits, typically across a laterally expansive area. Mainly located in arid climates. Pastoral uses with little to some cultivation.
Kaolin ¹	0.6 km ²	0.8 ha/100 p	Currently only 1 extraction area. Near removal of multiple hilltops. Adjacent to densely cultivated areas.
Salt ¹	115 km ²	1.1 ha/100 p	Fixed locations (salt lakes in Kasese District, some production from soils in Hoima District)
Total	515 km²		

Notes:

¹ Per person area impacts calculated based on 23 sites assessed for different commodities (clay, sand, stone, dimension stone, kaolin salt), area of land impacted (from analysis of googleearth images), average number of persons working at each site and duration of activities. With the exception for kaolin and salt, which are limited to one locality each, the total area impacted was extrapolated based on employment levels as estimated in the section on "Profile of the Development Minerals Sector. Profile of the Development Minerals Private Sector. ASM Employment and Incomes".

² Clay and clay bricks excludes production of soil/murram bricks. Sand excludes direct extraction from lakes. Both are limited to production within or on the margins of wetlands.

The rate of land degradation is highest for clay where: (i) near surface deposits can only be exploited to a certain depth and continued mining requires a lateral extension; and/or (ii) a growing workforce, rising demand and exploitation of new sites has augmented production levels. High rates of pit abandonment without any reclamation efforts (see section below on "Existing Mitigation and Management Measures") pose an ongoing concern for environmental integrity.

Although it requires deeper analysis, the Development Minerals sector may alleviate land pressures by providing a non-farm source of employment. There are an estimated 700,000 new entrants in Uganda's job market annually but the absorption capacity of most sectors is low and options beyond agriculture are limited.²⁰⁹ Based on current agricultural employment levels and

²⁰⁹ World Bank (2016) and www.data.un.org/countryprofile.asp?crName-uganda and cited in: Barreto et al. (2017).

land areas impacted, 100 farmers impact, on average, 161 hectares of land, which is between 23 and 1700 times higher than ASM Development Minerals, depending on the commodity. Although this provides some insight for comparative purposes, it does not account for the diversity and severity of different impacts associated with each sector. It is nevertheless useful to consider that, in the absence of ASM and assuming most miners would otherwise work in agriculture, the cultivated land area could increase by up to 811,000 hectares.

Land Used for Human Settlements and Other Infrastructure

In addition to agriculture, land disturbances resulting from Development Minerals production have the potential to physically impact other land users through:

- Rockfalls and landslides, potentially blocking roads, damaging houses and structures. Some stone quarries around Kabale Town, for example, are situated on steep hillslopes immediately adjacent to busy roads, with extraction taking place above 10-30 metre reaches of some pit walls angled at over 80°.
- These risks are most pronounced in areas where vegetation has been completely removed from the extraction area, benching practices are not employed, terrain is particularly steep and where and when rainfalls are the heaviest. In some sites, production actually relies on pushing large rocks, boulders or weathered ore downhill as a means to expedite transport to crushing and/or loading sites.
- Many ASM Development Minerals sites are situated close to their markets adjacent to or within peri-urban or urban areas. The density of Development Minerals operations is greatest within Uganda's capital, Kampala, and nearby towns and centres (Fig. 26, below).
- As described in the section on "Profile of the Development Minerals Sector: Range, Geographic Distribution and Markets of Development Minerals" (Fig. 7), stone aggregate, dimension stone, clay and sand production within the Kampala area takes place within 1238 different sites and impacts 53.7 km² of land. In many cases, production sites are located immediately within residential areas and, following exploitation, many sites are often unsuited to other land uses (although some developments of former stone aggregate and dimension stone quarries may be viable).

Figure 27: This 33-hectare clay brick production site is located in a densely populated area of Mukono. Although a forest buffer zone is present, this is additionally being impacted by human settlements in upper reaches of the wetland basin and is subject to some forest clearing, presumably for farming or housing developments (Image Source: GoogleEarth, 2017).



Given, in many cases, its proximity to local populations, the environmental impacts of the ASM Development Minerals sector on water, air and biota contribute to existing high levels of impact, meaning that also are likely to be more severe.

Potential Benefits to Soil Quality and Crop Production

Use of Development Minerals produced by ASM for use as soil amendments (i.e. low-cost inorganic fertilizers, pH amendment) is a largely unexploited opportunity with potential to create significant environmental benefits to the agriculture sector. A number of rocks are naturally enriched in key elements (e.g. potassium rich volcanic rocks, residual phosphate in limestone) and could be exploited, processed and marketed to help address rapid declines in soil fertility and resulting risks to food security. With the exception of vermiculite and (in the near future) phosphate production at industrial levels, this beneficial impact is limited to packaging and sale of low-grade limestone waste to sugar companies, which is used as a means to neutralize soil acidity needed to optimize sugarcane productivity.

Water Resources

Development Minerals are less prone to use of chemicals (particularly in the case of ASM) and potential deleterious elements (e.g. arsenic, cadmium) typically are not present in sufficient quantities to result in contamination concerns to the degree found in exploitation of metallic minerals. In the case of Development Minerals, risks to water resources are generally of greatest concern where: (i) sanitation and hygiene management is poor and human waste can enter waterways; (ii) atmospheric pollutants (dust) from operations settle on surface water; (iii) poor management of overburden and waste rock leads to siltation of waterways via run-off; and (iv) watercourses are re-routed, i.e. due to dumping of or run-off into streams and rivers.

Additional potential impacts on rainfall via climate change impacts from ASM development minerals are presented in the below section on “Climate Change Adaptation and Resilience”.

Degradation of Wetland Resources

The most severe impact of the Development Minerals ASM sector is the impact of clay and sand production on wetlands. Wetlands cover approximately 10.9% of Uganda’s land surface and provide a range of essential ecosystem goods and services.²¹⁰ Among these, they buffer water level fluctuations, acting as a sink for water in rainy seasons (aiding in flood attenuation) and releasing water in dry seasons supporting recharge of both ground and surface water.²¹¹ Wetlands additionally provide passive treatment of run-off and wastewater; thus, those situated around densely populated or high-industry areas are particularly crucial to environmental protection of water bodies and those reliant on them. Wetlands have additional socio-economic importance as cultural or recreation sites, they are sources of fish, papyrus, medicinal plants,

²¹⁰ NEMA (2016)

²¹¹ Waiswa, 2013.

²¹² The significance of the flood attenuation role of wetlands is well demonstrated in Eastern Uganda, where wetland degradation has led to an increase in frequency and severity of flooding in the region. Source: UNDP-UNEP, 2009, Enhancing Wetlands’ Contribution to Growth, Employment and Prosperity, Environmental and Natural Resources Report Series, Publ. UNDP/NEMA/UNEP Poverty Environment Initiative, Uganda, Kaggwa, R., Hogan, R., and Hall, B. eds., 73p.

wood poles and support both subsistence and income generating livelihoods (e.g. farming, clay and sand production).²¹³

Wetland degradation resulting from production of burnt clay bricks and sand is extensive:

- A total of 576 clay and 346 sand mining sites were identified within a roughly 75km radius of Kampala.
- The total area of impacted wetlands estimated at 221 km² (45 km² for clay and 176 km² for sand).²¹⁴ Although a small percentage of clay pits are converted into fish farms, the majority are abandoned and often subject to flooding both seasonally during operations and after clay extraction has ceased (Photo 17).
- The estimated 221 km² of wetlands degraded by clay and sand mining across Uganda in the past decade (averaging 751 km²/a)²¹⁵ constitutes less than 1% of all wetland area in the country.²¹⁶
- This exacerbates wetland losses attributed to conversion of wetlands to agriculture, which was estimated to account for loss of 11,268 km² in area of wetlands between 1994 and 2009 (averaging 751 km²/a).²¹⁷

In accordance with the mitigation hierarchy (i.e. prevention vs. minimization, restoration and offsetting), it useful to consider economic benefits derived from ASM production of clay



Figure 28: Flooded clay pit at Butende, Masaka, Uganda. Photo credit: Levin Sources

²¹³ Ibid.

²¹⁴ Kampala area estimates based on a 10% sampling rate (area calculations were determined for every 10th clay and sand mine tagged using GoogleEarth). Estimates of cumulative areas impacted derived for national levels based on average rate of degradation per annum per year (correcting for rates of production) derived from sites assessed during field research and interpolated from estimates of national burnt clay bricks. Sand mining taking place immediately within Lake Victoria are excluded from this estimate.

²¹⁵ Estimate is based on calculated per person production rates per annum and area (km²) impacted over the period of mine operations.

²¹⁶ This annual estimation draws from the methodology used by Barreto et al (2017), which assumed that brick (and in this case also sand) production increase in-line with escalating demand as indicated by changes in construction GDP (a 342% increase between the fiscal year 2008/2009 and 2015/2016) and corrected for the burnt clay brick index price increase (+68% for the same period).

²¹⁷ Wetlands Management Department: Ministry of Water and Environment, Uganda Bureau of Statistics, International Livestock Research Institute, World Resources Institute: Mapping a Better Future: How Spatial Analysis can Benefit Wetlands and Reduce Poverty in Uganda. 2009, Washington DC and Kampala: World Resources Institute

products and sand, as detailed in the below section on “Gender Dimensions of Development Minerals Production”. A 2013 economic valuation of wetlands goods and services in the Kampala region provides additional insights. The study found that non-income generating wetland uses and functions (e.g. subsistence crops, water supply, cost savings for water treatment, flood control) amounted to 58% of the total wetland value. Income generation from production and sale of clay bricks, pottery and stoves constituted 41% of total value, followed by commercial farming and thatch harvesting at less than 1%.²¹⁸ These results attest to the economic significance of wetlands from a livelihood perspective as well as their natural capital (economic value) in terms of costs to government and residents that are saved by the prevention of potential flooding of households, gardens and roads.

Atmosphere

Main atmospheric impacts relate to dust dispersion and atmospheric emissions of CO₂ and other gases during firing of clay bricks and lime production.

Dust Dispersion and Soil Quality

Although lithology (rock type) of underlying rocks naturally affects soil structure and composition, including baseline soil nutrient levels, disturbance of natural conditions due to mining can detrimentally impact soil quality and impede growth of vegetation including crops. This can undermine future opportunities for post-mining agricultural land use and can impact current agricultural productivity in areas adjacent to mines.

Impacts are primarily due to removal of soil horizons prior to extraction and, to varying degrees, through dispersion of dust during processing, handling and transport of minerals. This is most pronounced for limestone, kaolin, stone aggregate, dimension stone and salt, which generate significant quantities of fine dust although impacts vary between commodities and sites, including according to local microclimatic conditions, volume of dust produced and chemistry of dust particles (e.g. limestone quarries produce highly alkaline - and reactive - dusts). In summary:

- Impacts are likely most severe when they are located immediately adjacent to areas where cultivation and livestock grazing is taking place although the extent of dust dispersion will vary according to local production levels, wind currents and direction, precipitation rates and other factors. Discolouration and/or coating of grasses generally seem to be relatively localized around mine sites (i.e. less than 50m from sites).
- For commodities where deposits are near to the surface and underlie a large area but are extracted in localized pockets, geology is likely to play a role in baseline soil quality and crop selection by local farmers. For example, within limestone and lime areas in Kasese District, soils are extremely alkaline, fertility is relatively low and, with the exception of livestock rearing and in some places cotton, most crop farming is limited to the lowlands farther from limestone deposits.

²¹⁸ G. Wasswa, F Mugagga, and V. Kalembo, (2013). Economic Implications of Wetland Conversion to Local People's Livelihoods: The Case of the Kampala-Mukono Corridor (KMC) Wetlands in Uganda, *Academic Journal of Environmental Sciences*, 1(4):066-077.

- The large number of livestock observed grazing around or within almost all ASM Development Minerals sites assessed suggests that impacts on vegetation consumed by animals may be limited. Some resilience or adaptation by local strains of grasses to underlying geologic conditions could be expected.
- Soil quality is also an issue for clays, which is completely removed and where underlying soils generally have low-organic carbon contents or, in the case of wetlands, where water tables are relatively shallow and are prone to flooding (Figure 28). Sandy soils are similarly prone to flooding following excavation, however, in the case of riverine deposition (e.g. wetland extraction in Masaka District) and to some extent lakeside, some degree of regular sand replenishment can be anticipated.
- Poor management of soil and non-soil overburden removed prior to excavation also plays a role. Few ASM sites assessed engage in the practice of side-casting and separately stockpiling soil horizons or non-soil overburden for the purpose of post-mining backfilling and recontouring (in the case of overburden) and soil replacement for replanting. Abandonment of exploited pits provides a serious impediment to post mining land uses. Limestone miners in Kasese District, however, have adopted the process of progressive reclamation by way of backfilling pits with overburden following extraction.

Emissions of Co2 and other gases

Emissions in the form of carbon dioxide, carbon monoxide (and to a lesser degree sulphur dioxide, nitrogen dioxide and fluorine and chlorine gases) are mainly associated with combustion of wood and minerals found in clays (e.g. micas, iron sulphides, residual organic matter).^{219 220} This



Figure 29: A clay site in a wetland area, Kyalusowe, Masaka, Uganda. Photo credit: Levin Sources

issue is most pronounced for clay brick production (particularly when cumulative effects are considered) although lime production is also a source of emissions.

Where wood (and/or source minerals) contain low levels of heavy metals with a potential to be volatilized (e.g. mercury or lead), this can also cumulatively create a plume around burn sites. This effect is likely to be quite minimal, particularly in the case of ASM given the size of kilns, but may pose a greater concern for industrial operations, particularly if emission controls are not in place.

²¹⁹ Guttikunda, S.K., Begum, B.A. and Wadud, Z. (2012) Particulate Pollution from Brick Kiln Clusters in the Greater Dhaka Region, Bangladesh. *Air Quality, Atmosphere & Health*, 6, 357-365. <https://doi.org/10.1007/s11869-012-0187-2>

²²⁰ Nyakairu a, G.W.A, Kurzweil, H., and Koeberl, C.(2001).

Biota

All ecosystem compartments are interconnected; thus an impact in one area has a potential to impact another. For example, dust emissions to the atmosphere pose risks to respiratory systems of humans or affect livestock and crops, wetland degradation can negatively impact water quality and result in impacts on the health of humans or fish stocks and land degradation may be accompanied by clearing of forests or bushland.

These impacts have been alluded to in preceding sections, with more direct impacts mainly related to: consumption of forest products (mainly in conjunction with clay brick and lime production); and direct and indirect impacts on wildlife.

Consumption of Forest Resources

Wood is consumed in large quantities for both production of clay products (bricks, pots) and lime from limestone, resulting in depletion of forest resources. Although larger, industrial producers such as Hima Cement Ltd. and Uganda Clays Ltd., also rely to some extent on wood, typically with other sources of carbon (e.g. coffee husks), related impacts of these operations have not been quantified but are expected to be significant.

In the case of ASM, estimates of wood consumption are summarized as follows:²²¹

- *Lime*: Based on current production methods, lime consumes approximately two tonnes of wood for each tone of lime produced.²²² Based on production from ASM sites in Kasese and Tororo Districts, this is estimated at roughly 41,000 tonnes of wood per annum, potentially affecting about 13 km² of forest.
- *Clay*: Based on data collected during field research and that published by others in Uganda,²²³ one average, artisanally produced brick consumes, 0.56 kg of wood. Based on production estimates presented in the section on “Profile of the Development Minerals Sector: Development Minerals Production, Imports and Exports: Production”, this equates to almost 2.9 million tonnes per annum of wood, affecting roughly 450 km² of forests from which it was sourced.

Direct and Indirect Impacts on Wildlife

Wildlife species live in communities that depend on each other. Survival of these species can depend on soil conditions, local climate, vegetation, altitude, and other features of the local habitat. Mining causes direct and indirect damage to wildlife with impacts primarily stemming from disturbing, removing, and redistributing the land surface and destruction of vegetation.²²⁴

- Destruction or displacement of species in areas of excavation and piling of mine wastes. Mobile wildlife species, like game animals, birds, and predators, leave these

²²¹ Area of forest impacted was derived from area impacted for sawn timber demand (607,000 m³ with an area equivalent of 5,365 ha using a eucalyptus density of 0.56 g/cm³) as described in Kaboggoza 2011.

²²² J. Spiropoulos, (1985) Small Scale Production of Lime for Building, GTZ/ German Appropriate Technology Exchange (GATE) publ, Braunschweig ; Wiesbaden : Vieweg, 1993. 547p.

²²³ Hashemi and Cruickshank, 2015; Niwamara et al, 2016, and the ELITH Project (www2.warwick.ac.uk/fac/sci/eng/elith/publications/all_publications/elith-u01.pdf)

²²⁴ ELAW (2010). Guidebook for Evaluating Mining Project EIAs. Accessed October 2nd. 2017. <http://www.elaw.org/files/mining-eia-guidebook/Chapter1.pdf>

areas. More sedentary animals, like invertebrates, many reptiles, burrowing rodents, and small mammals, may be more severely affected.

- Filling or draining of streams, lakes, ponds greatly impacts fish, aquatic invertebrates, and amphibians. Food supplies for predators are reduced by the disappearance of these land and water species.
- Vegetation provides essential food, nesting sites, and cover for escape from predators. Mining results into destruction of this vegetation thereby reducing the quality and quantity of habitat essential for waterfowl, shore birds, and many terrestrial species.

Existing Mitigation and Management Measures

Very few sites take action to prevent, control, manage or rehabilitate. However, research for this study encountered some good examples:

- Progressive backfilling of pits as mining advances across the affected area in ASM limestone quarries in Kasese.
- Planting of or retaining trees between quarries in order to support soils stabilization (some stone quarries), offset environmental impacts (kaolin) and reduce wood fuel costs (one clay site in Arua).
- Excavating “chutes” in rocks to channel rocks as they are pushed down hillslopes to prevent negative impacts to infrastructure downslope.
- Converting abandoned clay pits into fish farms (post-mining land use).
- Mixing coffee husks with fuel wood for firing of clay bricks at Butende Brickworks in Masaka.

The majority of sites take little to no environmental management measures representing a concern for long-term environmental integrity. This situation is most pronounced for sand, clay aggregate and stone quarries, where most abandoned sites are left for “natural reclamation”.



Figure 30: A high degree of environmental resilience is suggested in this clay brick production site, shown when active (2010, at left) and after abandonment (2014, at right). Capacity of the ecosystem to recover from environmental impacts likely varies with local conditions and the severity and extent of initial impacts to the area (Source: GoogleEarth, 2017).

Although some degree of resilience has been observed, as exemplified in Figure 29, the lack of post-mining rehabilitation poses long term risks to people and livestock (e.g. falling in pits), and impediment to post mining land uses and may additionally impact water resources by changing the hydrologic system.

Climate Change Adaptation and Resilience

Climate change can affect the Development Minerals sector in various ways. The biggest impact by far is the effect it has on other sectors such as agriculture, where commodity failures occur, forcing their workforce to generate income elsewhere. Mining is often a desirable alternative. The unpredictability of seasons and the related spatial rains also affect production, with all miners and SME operators interviewed reporting that the activities slow down during the rainy season. Reasons for this ranged from the difficulty of extraction from flooded sites, slippery and impassable roads, and a less demand for materials due to lower construction rates, among others. This results in a much-decreased rate of production, and higher transport costs, leading to higher commodity prices, the butt of which are often pushed down to the miners.

The various commodities are sensitive to climate change-induced heavy rains in different ways. Sand sites become water logged and the sand itself very heavy, making it difficult to transport. In the clay sector, dry wood for burning kilns is harder to come by. Stone and limestone quarries flood. In order for the sector to adapt to and become resilient to climate change, a number of measures can be taken:

Table 14: Potential adaptation and resilience measures against climate change

Climate Change Issue	Adaptation Measure	Resilience Measure	High Risk Commodity/ Dependent
Water Scarcity	-Onsite water harvesting and storage	Water resources conservation measures	Clay and sand
Wood scarcity	Afforestation Fuel efficient Kilns Sand Bricks "Un-burned" bricks technologies	Alternatives like Gas Kilns e.g. the oil and gas discoveries in the Albertine	Clay products, Lime Production
Resource depletion	-Efficiency in mining and resources handling	Alternatives	All
Seasonal fluctuations/ unpredictability	-Climate Risk management measures and early warning e.g. weather information use for planning and forecast -Better road infrastructures -Establishing urban outlets in addition to the rural onsite points -Construction of shades(rain protection) -Water management techniques onsite	Alternative livelihoods	All

Occupational Impacts and Management Measures

Whether large or small in scale, formal or informal, work in the mining sector is widely regarded as one of the most occupationally hazardous jobs in the World. Given that ASM is characterized by a high degree of informality and labour intensiveness combined with lack of financial resources, training and expertise, safety and health risks tend to be more pronounced in ASM than LSM. Despite widespread underreporting, the incidence of non-fatal accidents is 6-7 times higher in ASM compared to LSM and fatalities are estimated at up to 90 times higher²²⁵.

This section examines the most common occupational risks and impacts found in ASM Development Minerals in Uganda and examines their likelihood, potential severity and proposed mitigation measures for different commodities in the context of an IA framework. Existing mitigation and management measures are also outlined.

Occupational Safety and Health Impacts

Main occupational impacts of ASM of Development Minerals in Uganda are a consequence of a range of hazards and risks, which differ by commodity, local conditions, job function, individual and other factors. Common hazards and risks observed in Ugandan ASM sites are summarized in Table 15 and described further below according to their respective hazard/risk categories (physical, biological, chemical, work design, mechanical/electrical and stress related).

Table 15: Main Occupational Safety and Health Hazards and Risks in ASM Development Minerals in Uganda

Type of Hazard	Related Risk	Mineral Commodity						
		Clay Bricks	Sand	Stone Aggregate	Dimension Stone	Limestone/ Marble	Kaolin	Salt
Physical Hazards and Risks								
Common Health Hazards:	Main Health Risks:							
Sun and heat.	Heat stress related illnesses, heat stroke	✓	✓	✓	✓	✓	✓	✓
Dust.	Respiratory illness, (e.g. silicosis, kaolinosis), skin disorders, eye damage.	✓	✓	✓	✓	✓	✓	✓
Vibration	Vibration white finger; numbness in fingers, hands.	-	-	✓	✓	✓	✓	✓
Noise	Hearing loss	-	-	✓	✓	✓	✓	-
Radiation	Cancer	-	-	+/-	+/-	-	-	-
Smoke	Respiratory illnesses, asthma	✓	-	-	-	-	-	-

²²⁵ Jennings, N. (ed.), 1999, Child labour in Small Scale Mining, Examples from Niger, Peru and Philippines, ILO Sectoral Activities Programme, Working Paper, A 100 21499 999, ILO publ., Geneva, 74

Type of Hazard	Related Risk	Mineral Commodity						
		Clay Bricks	Sand	Stone Aggregate	Dimension Stone	Limestone/ Marble	Kaolin	Salt
Common Safety Hazards:	Main Safety Risks:							
Rock falls, pit wall collapse.	Broken limbs, wounds, head injuries, fatalities, etc	-	✓	✓	✓	✓	✓	-
Flying rock fragments; dropped stones	Wounds, eye injury, loss of sight	-	-	✓	✓	✓	✓	✓
Flooding.	Drowning, death	✓	✓	+/-	+/-	+/-	-	✓
Biological Hazards and Risks								
Common Health Hazards:	Main Health Risks:							
Bacteria, viruses and pathogens (sewage).	Diarrheal diseases (e.g. cholera, typhoid), skin rashes/ infections	✓	✓	+/-	+/-	+/-	+/-	✓
Dust and moulds.	Allergies, asthma	✓	✓	✓	✓	✓	✓	✓
Parasites and burrowing insects.	Parasitic diseases (e.g. malaria, bilharzia, hookworms), skin rashes and infections.	✓	✓	+/-	+/-	+/-	+/-	✓
Common Safety Hazards:	Main Safety Risks:							
Poisonous snakes and spiders.	Poisoning, skin infections, potentially death	✓	✓	+/-	+/-	✓	+/-	✓
Wildlife attacks.	Wounds, injuries, potentially death.	+/-	+/-	+/-	+/-	+/-	+/-	✓
Chemical Hazards and Risks								
Common Health Hazards:	Main Health Risks:							
Battery acid, solvents, diesel, petrol, lubricants.	Skin sores and irritation, skin cancer, poisoning (if ingested).	-	-	-	-	-	-	-
Exhaust from generators, equipment, vehicles.	Respiratory illnesses	-	-	-	-	-	-	-
Quick lime/ hydrated lime	Severe skin burns due to prolonged contact with "wet" lime during hydration of quicklime.	-	-	-	-	✓	-	-

Type of Hazard	Related Risk	Mineral Commodity						
		Clay Bricks	Sand	Stone Aggregate	Dimension Stone	Limestone/ Marble	Kaolin	Salt
Salt water and rock salt	Skin rashes and infections, severe dehydration and wounds of membranes (eyes, lips, genitalia)	-	-	-	-	-	-	✓
Common Safety Hazards:	Main Safety Risks:							
Battery acid, solvents, diesel, petrol, lubricants	Chemical burns, loss of sight,	-	-	-	-	-	-	-
Harmful fumes, gases (exhaust, smoke)	Suffocation and death	-	-	-	-	-	-	-
Ergonomic Hazards and Risks								
Common Health Hazards:	Main Health Risks:							
Repetitive motion.	Chronic neck, back and muscle pain; muscle hardening; numbness, loss of feeling in fingers and hands, blistering.	✓	✓	✓	✓	✓	✓	✓
Heavy loads.	Muscle hardening, spinal compression and related chronic pain.	✓	✓	✓	✓	✓	✓	✓
Awkward body positions (e.g. lifting)	Chronic or acute neck, back and muscle pain.	✓	✓	✓	✓	✓	✓	✓
Equipment and Installations Hazards and Risks								
Common Safety Hazards:	Main Safety Risks:							
Poorly maintained or misused tools.	Wounds (e.g. pick flies free from axe), loss of an eye.	✓	✓	✓	✓	✓	✓	+/-
Machines/ moving parts.	Loss of or injuries to fingers, limbs.	-	-	-	-	-	-	-
Electrical currents	Electrocution	-	-	-	-	-	-	-
Stress Related Hazards and Risks								
Common Health Hazards:	Main Health Risks:							

Type of Hazard	Related Risk	Mineral Commodity						
		Clay Bricks	Sand	Stone Aggregate	Dimension Stone	Limestone/ Marble	Kaolin	Salt
Sexual, physical, verbal harassment, threats humiliation, etc	Depression, low self-esteem and related implications (risks of alcohol abuse, marital discord). Insomnia, exhaustion	✓	✓	✓	✓	✓	+/-	✓
Exploitation	Malnutrition. Stress related diseases.	✓	✓	✓	✓	✓	✓	✓
Long work hours		✓	✓	✓	✓	✓	✓	✓
Lack of social ties (if migration related)	Social exclusion, depression, low self esteem and related effects.	✓	✓	+/-	+/-	+/-	+/-	+/-
Common Safety Hazards:	Main Safety Risks:							
Alcohol and drugs.	Alcoholism, liver disease; depression; injuries from accidents due to intoxication; conflict risks.	+/-	✓	+/-	+/-	+/-	+/-	+/-
Sexual or physical violence	Injuries from violence, rape, STDs, related stress and social impacts.	+/-	+/-	+/-	+/-	+/-	+/-	+/-
Long work hours	Exhaustion-related injuries (e.g. due to trip and fall, accidents with tools)	+/-	+/-	+/-	+/-	+/-	+/-	+/-

Notes:

¹ Adapted from: Dreschler, B., Hinton, J. and Walle, M., 2010, Occupational Safety and Health Systems in Small Scale Mines, Policies and Guidelines for Small Scale Mines in Rwanda, Report to BGR and OGMR, 78p.

² Only those hazards and risks in Development Minerals currently in production by ASM in Uganda (excludes those currently not in production, e.g. gypsum, gemstones).

✓ commonly observed documented risks;

+/- some likelihood of occurrence or site specific;

- low or no likelihood of occurrence

Physical Hazards and Risks

The most common physical hazards that pose risks of occupational illness, injury or fatalities are associated with rock falls and pit wall collapses, regular and/or prolonged exposure to dust, heat, noise and pit flooding.

Rock Falls and Pit Wall Collapses in Quarries.

This is believed to be a main cause of serious injury and fatalities in ASM of Development Minerals, with highest risks in quarries of aggregate, dimension stone, limestone, kaolin and sand.

Likely due to fears of repercussions from authorities, most artisanal miners are hesitant to report fatalities in their operations. A survey of Ugandan media articles between May-2008 to June-



Figure 31: Vertical pit walls at the Kiyora stone quarry in Kabale, Uganda. Photo credit: Levin Sources

2017 documented 15 incidents resulting in the death of 18 people (11 men, 3 women, 3 boys, 1 girls) and serious injuries to 5 persons in ASM sites around the country, a much lower rate than would be expected given the workforce size and working conditions. Nevertheless, 34% of quarry sites assessed reported at least one fatality associated with rock falls and pit wall collapses in the past 1.5 years, equating to a fatality rate of 1.1 persons per 1,000 stone quarry workers per annum.²²⁶ Main causes were associated with falling rock striking mineworkers and sand miners suffocating following collapse of sand pit walls.

These risks are mainly a consequence of steep pit walls (lack of benching), excess vegetation removal, poor surface water management and, particularly in the case of limestone, piling of waste rock immediately adjacent to the pit wall. In many sites, the steep gradient is relied upon to speed up production by pushing material downhill to crushing or loading areas.

Specific examples found during this study include:

- Pit walls in excess of 40m and at angles of vertical or near vertical can be found in multiple stone aggregate and dimension stone quarries across the country as well as some kaolin mines (Figure 30).
- Limestone quarries tend to be shallower (e.g. up to 10m) and occur in comparably drier localities but have nevertheless experienced accidents associated with collapse of waste rock into the pits.
- Sand mining also takes place at shallow depths (typically 2-5m). Tunnels sometimes follow pockets of higher quality sand posing serious risk.
- This situation is exacerbated by the lack of suitable personal protective equipment (PPE) as needed to protect mineworkers from injuries. In the case of rock falls and pit wall collapses, this should include hard hats, gloves and boots. Suitable PPE was found at only one site assessed, the Kiyora kaolin mine, where over 80% of workers on site were equipped with rubber boots.

Exposure to Elevated Dust Concentrations

The entire ASM Development Minerals workforce faces varying degrees of risks due to dust related illness, injuries (e.g. wounds) and disease in accordance to job, individual, site and environmental factors. The prevalence of respiratory illness due to dust exposure is difficult to quantify,

²²⁶ This is far from a defensible statistic but the rough estimate (derived from the number of fatalities reported in the 1.5 year period in stone quarries and the total stone quarry workforce in sites assessed) provides a clear indication of severity of related risks.

particularly given lack of local capacity to clinically diagnose these conditions, similarity of symptoms with (and often increased susceptibility to) other illnesses such as tuberculosis, chronic bronchitis and asthma, and the often slow but progressive rate of disease development.

Risks associated with dust inhalation are nevertheless well documented internationally, with most serious impacts attributed to pneumoconiosis, which is comprised of a range of inhalation associated respiratory diseases distinguished according to the type of dust. Resulting symptoms include chronic cough, fibrosis and inflammation of the lungs.²²⁷ Cases that have advanced to progressive massive fibrosis (PMF), characterized by extensive scarring in the lungs, the disease can lead to respiratory system failure and increase risks of lung cancer, tuberculosis and heart failure.²²⁸ The main forms of pneumoconiosis found in ASM of Development Minerals are silicosis and kaolinosis.

Silicosis, caused by inhalation of fine particles of crystalline silica (SiO_2). Exposure mainly occurs during breaking, crushing, sieving and loading of rock or materials with high silica contents.

- *Stone aggregate and dimension stones*. The majority of these products in Uganda are derived from quartzite or orthoquartzite²²⁹, which contains 90-99% SiO_2 . The average man and woman mineworker in these commodities spends 11 and 10 hours per day, respectively, engaged in tasks exposing them to high concentrations of silica dust (Figure 31).



Figure 32: Miners are often without the appropriate PPE and accidents are common. (Stone aggregate mining at Kiyora, Kabale)
Photo credit: Levin Sources

²²⁷ Pneumoconiosis (2017) Johns Hopkins Health Library. http://www.hopkinsmedicine.org/healthlibrary/conditions/respiratory_disorders/pneumoconiosis_134,162

²²⁸ Ibid.

²²⁹ This includes "slaty quartzite", often erroneously called "slates". The majority of stone aggregate and dimension stone sites assessed were producing from quartzitic rocks. Other types of rocks extracted for stone aggregate and dimension stones also contain high silica contents including sandstone (ca. 90% SiO_2), phyllites (40-55% SiO_2), gneiss (60-70% SiO_2) and granodiorite (55-65% SiO_2). Mudstone/siltstone is also used to produced rough stone tiles in some localities (e.g. Lyantonde District in southwest Uganda) but contained much lower silica contents. Source of silica concentrations: "Quartz as a Rock Forming Mineral" (2005) Source: http://www.quartzpage.de/gen_rock.html; Geological Survey Research (1969) Source: https://books.google.co.uk/books?id=x8VRAQAAMAAJ&pg=SL2-PA69&lpg=SL2-PA69&dq=chemical+composition+phyllites+sio2&source=bl&ots=XMO_lbOmxY&sig=2tHcRdUII1tQtO6oyaCYyN-MwcSM&hl=en&sa=X&ved=0ahUKewin17DkpeHWAhWF7hoKHd8jBzEQ6AEIMzAB#v=onepage&q&f=false;http://weppi.gtk.fi/publ/foregsatlas/text/Si_SiO2.pdf

- *Sand.* Sand is primarily comprised of silica (typically over 95% SiO₂). Excessive dust exposure is of greatest concern during loading of haul trucks and to a slightly lesser extent during digging.
- *Other commodities.* Fine quartz particulate also occurs in dust from clay (52-85% SiO₂)²³⁰, limestone (4-9 % SiO₂)²³¹, kaolin at (30% SiO₂)²³² and pozzolana (45%)²³³. The extremely high concentrations of dust generated during loading trucks is an often overlooked exposure pathway but, particularly given this and the frequency and duration of exposure, is expected to cumulatively result in serious health risks for mineworkers (Figure 32). Given that pozzolana is extracted and loaded in larger blocks, risks are expected to be lower than for other commodities.

Chronic cough and chest pain were reported by miners at 53% of stone aggregate, sand and dimension stone quarries as one of the main illnesses resulting in lost workdays. In the absence of air sampling and clinical assessments, it is difficult to accurately determine the prevalence of silicosis, however, parallels can be drawn to other assessments of silica exposure under similar working conditions. Air sampling within the breathing zone of workers at surface mines in ASM gold sites in Tanzania (where gold-bearing quartz veins are also extracted, crushed and pulverized) found average silica concentrations of 0.19 mg/m³, equivalent to 4-times than the Recommended Exposure Limit put forward by NIOSH and approximately 200 times greater than that found in large scale mines²³⁴. In the case of minerals that contain silica in lower concentrations (e.g. clay, kaolin), silicosis may also be significant. One extensive cross-sectional study of respiratory health of clay brick workers in South Africa found that 4.5% of the workforce had



Figure 33: Artisanal Miners extracting clay used for pottery in Busana work in bare feet, Mbale.
Photo credit: ECO Uganda

²³⁰ Nyakairu a, G.W.A, Kurzweil, H., and Koeberl, C.(2001)

²³¹ Olatunde, P; Juliano, A; Olaoye, O (2014). The Physico-Chemical and Mineralogical Compositional Characteristics of Limestone and Shale Sediments around Yewa River, South Western Nigeria. Quest Journals. Accessed 8th October 2017. https://www.researchgate.net/profile/Popoola_Samuel_Olatunde/publication/281811003_The_Physico-Chemical_and_Mineralogical_Compositional_Characteristics_of_Limestone_and_Shale_Sediments_around_Yewa_River_South_Western_Nigeria/links/55f9202b08aeba1d9f179b8a/The-Physico-Chemical-and-Mineralogical-Compositional-Characteristics-of-Limestone-and-Shale-Sediments-around-Yewa-River-South-Western-Nigeria.pdf

²³² Lehto, T., Pekkala, Y. et al, 2011, Geological Mapping, Geochemical Surveys and Mineral Resources Assessment in Selected Areas of Uganda, Report to the Ministry of Energy and Mineral Development, 146p.

²³³ Harichane, K., Ghrici, M., Use of Natural Pozzolana and Lime in Stabilization of Cohesive Soils, Geological and Geotechnical Engineering, https://www.researchgate.net/publication/225497112_Use_of_Natural_Pozzolana_and_Lime_for_Stabilization_of_Cohesive_Soils

²³⁴ Gottesfeld, P, Andrew D. and Dalhoff, J., 2015, Silica Exposures in Artisanal Small-Scale Gold Mining in Tanzania and Implications for Tuberculosis Prevention, J Occup Environ Hyg. 2015;12(9):647-53.

indications of respiratory damage in chest x-rays²³⁵. In general, the prevalence of silicosis and tuberculosis (TB) is estimated to be approximately 5-6 times higher in the ASM workforce than the general population.²³⁶

Kaolinosis is a form of pneumoconiosis associated with kaolin dust inhalation. It is characterized by chronic pulmonary fibrosis; chronic gastritis, bronchitis, cough, difficulty breathing and mild decreases in lung function.²³⁷

Ore produced at one kaolin mine assessed was determined to consist of 65% kaolinite²³⁸. Although prevalence of kaolinosis has not been clinically assessed in Ugandan kaolin mines, at one industrial kaolin processing plant in the United States, 5.4% of the workforce who had worked at the site for between 12 and 35 years had pleural thickening (scarring, calcification of the lining of the lungs)²³⁹. One study of kaolin miners in the UK found the incidence of kaolinosis increases with time, increasing from 4% for workers working for less than 15 years to 19% for those working in kaolin mines for more than 25 years²⁴⁰. Kibalya has only been operating for 10 years, yet risks could be considerably higher given the lack of dust suppression measures, suitable PPE (dust masks) and other management measures that would be expected of an industrial operation. Risks are believed to be higher for those engaged in crushing and loading than for those engaged in extraction.²⁴¹



Figure 34: Loading the trucks generates dust. (Kaolin, Buhweju). Photo credit: Levin Sources

Limestone and lime dust related impacts are not classified as a source of pneumoconiosis (aside from those related to silica inhalation), but limestone and lime dust (quicklime, hydrated) exposure do pose risks. Potential symptoms of excessive, prolonged or frequent limestone dust exposure include irritation of eyes, skin and mucous membrane as well as coughing, sneezing, thin mucous discharge and excessive production of tears.²⁴²

²³⁵ As indicated by a radiological profusion score $\geq 1/0$ deemed to be significantly related to cumulative respirable dust exposure. Source: Myers & Cornell, 1989; Myers et al., 1989b cited in: WHO, 2005, Environmental Health Criteria 231: Bentonite, Kaolin and Selected Clay Minerals, Report to WHO, ILO and UNDP, 196p.

²³⁶ Ibid.

²³⁷ OSHA (2017) Kaolin (Total Dust), U.S. Department of Labor, https://www.osha.gov/dts/chemicalsampling/data/CH_248800.html

²³⁸ Lehto, T., Pekkala, Y. et al, 2011.

²³⁹ OSHA (2017)

²⁴⁰ Adams, Z. and Williams, R.B., (2005) Bentonite, Kaolin and Selected Clay Minerals, International Labour Organization publ., 196p.

²⁴¹ One study found average air concentrations of 1.74 mg/m³ in processing areas and only 0.14 mg/m³ in extraction areas. Source: Altekruze, E.B., Chaudhary, B.A., Pearson, M.G. and Morgan, W.K.C, 1984, Kaolin dust concentrations and pneumoconiosis at a kaolin mine, Thorax, 39:436-441.

²⁴² OSHA (2017) Limestone (Total Dust), U.S. Department of Labor, https://www.osha.gov/dts/chemicalsampling/data/CH_249400.html

Symptoms associated with caustic, quick or hydrated lime exposure include eye irritation, upper respiratory system irritation, and bubbling or blistering of skin²⁴³. Limestone miners and lime producers at sites in Eastern Uganda have reported cough as a main illness resulting in lost workdays while, in Western Uganda, mineworkers report burns to skin (particularly when sweating) and eye irritation as critical issues.

Given the lack of dust management procedures, and the high quantities of dust observed in the air, the OSHA PEL and NIOSH limit of 5 mg/m³ TWA in air²⁴⁴ for various forms of calcium hydroxide exposure (quick, caustic or hydrated lime) are expected to be exceeded during sieving, milling and filling of bags at lime production sites. NIOSH Recommended Exposure Limits of 10 mg/m³ for limestone dust could be exceeded during crushing.



Figure 35: Dust is a particular problem at lime production sites. Muhokya, Kasese, Uganda. Photo credit: Levin Sources



Figure 36: Loading trucks at the Kaolin mine site, Kibalya, Buhweju. This generates significant amounts of dust. Photo credit: Levin Sources

Salt dust related impacts are also not classified as a source of pneumoconiosis but respiratory ailments are common among salt miners although difficult to distinguish from TB and other ailments. Chronic cough and chest pains were reported by 20% of adult men and 17% of adult women mineworkers surveyed in 2005/06, which was more than 5 and 2 times, respectively, than those engaged in other livelihoods. Within the surrounding community, acute and persistent coughs were reported by 19.6% and 19.7% by males and females in all livelihoods,²⁴⁵ half of which were attributed to children under the age of 16 years²⁴⁶. Additional concerns reported by mine workers include eye irritation, skin diseases and sores as a consequence of salt dust and brine exposure, as discussed further under the below section on “Chemical Hazards and Risks”.

²⁴³ OSHA (2017) Calcium Hydroxide (Respirable Fraction), https://www.osha.gov/dts/chemicalsampling/data/CH_224398.html

²⁴⁴ PEL: Permissible exposure limit. Concentration which must not be exceeded at any time during an 8-hour shift and 40-hour workweek. TWA: time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek. Sources: OSHA, 2017, Limestone (Total Dust), U.S. Department of Labor, https://www.osha.gov/dts/chemicalsampling/data/CH_249400.html and OSHA, 2017, Calcium Hydroxide (Respirable Fraction), https://www.osha.gov/dts/chemicalsampling/data/CH_224398.html.

²⁴⁵ Hinton, J. (2011). Research also indicates that the prevalence of tuberculosis is high in the salt mining community according to local health workers. Whether local health care workers are documenting occupational respiratory risks as TB (or vice versa) has not been determined.

²⁴⁶ Ibid.

Flying Rock Fragments

When rock is broken with sledgehammers, hammers, pickaxes, other rocks and other tools, small fragments of rock commonly fly off, causing cuts, wounds and injuries, including to hands, feet, arms, legs and eyes. Loss of an eye, blindness and other damage to eyes due to flying rock fragments has been cited by mineworkers as a serious health issue in over half of stone aggregate and dimension stone sites surveyed.

Heat Exposure

Heat related illnesses, such as heat exhaustion and heat stroke, are caused by prolonged exposure to high temperatures. Symptoms include extreme thirst, dehydration, faintness, dry skin, headaches, and dizziness, shortage of breath, heart palpitations, muscle cramps, nausea, vomiting and diarrhoea. Heat stress can advance to heat stroke, particularly when exacerbated by prolonged exposure to the sun. Heat stroke, which results from prolonged sun exposure, can lead to failure of the body to regulate temperature and is characterized by fever, unconsciousness and potentially death.

Heat stress is a response to “overall heat load” resulting from the combined effects of: (i) body heat internally generated based on intensity of the work function(s), digestion, hormones and chemical exposures; (ii) environmental factors (air temperature, humidity, wind, etc); and (iii) clothing worn²⁴⁷. Individual factors, including age, gender and presence of other (and specific types of) health conditions, can compound susceptibility to heat related illness²⁴⁸.

Given local climatic, heat load and individual susceptibility factors, greatest risks are associated with a range of issues:

- *Mineworkers at sites experiencing the highest temperatures over the greatest number of months*²⁴⁹. This includes those in salt and limestone in Kasese District (Western), limestone in Tororo (Eastern) and Moroto (Northern) Uganda, respectively, as well as all stone aggregate, clay and sand production sites found particularly in areas that regularly exceed 30 C (Gulu, Arua, Moroto Districts in the north, within the Great Rift Valley (e.g. Kasese District) and Eastern Uganda (e.g. Soroti, Tororo).
- *Mineworkers over the age of 45 years*. This group constitutes less than 20% of the ASM Development Minerals workforce, with the greatest proportion of workers in this age bracket found in stone aggregates²⁵⁰. Persons over the age of 60 years and children, which were encountered in most ASM sites assessed, are even more vulnerable.
- *Mineworkers performing high energy exertion functions*. All work in ASM Development Minerals is labour intensive, with heaviest workloads associated with extraction and hauling, the former of which is generally dominated by younger men and the latter, in many but not all sites, by

²⁴⁷ Canadian Center for Occupational Health and Safety (CCOHS), 2017a, Factsheet: Hot Environments, Health Effects and First Aid, http://www.ccohs.ca/oshanswers/phys_agents/heat_health.html

²⁴⁸ CCOSH, 2017a.

²⁴⁹ Climatic conditions vary widely in Uganda according to elevation, season (rainy, dry), wind patterns, landscape, humidity and other factors, with temperatures generally ranging between 15°C- 30 °C with a mean daily temperature of 28 °C. Source: NEMA, 2007, State of the Environment Report for Uganda, 2006/07, <http://wedocs.unep.org/handle/20.500.11822/9237?show=full>.

²⁵⁰ Based on mineworkers sampled in focus group discussions.

women (particularly in stone quarries). Related risks are likely exacerbated by lack of breaks, limited access to shade and where drinking water is costly or difficult to access.

- *Mineworkers with respiratory illness.* For those suffering from dust inhalation related illnesses, added risks of heat related illnesses severely impact those involved in rock breaking, crushing and loading (described above).
- *Mineworkers with skin rashes, infections or diseases.* This includes those resulting from dust exposure (e.g. lime and salt) and prolonged immersion in water (e.g. clay, salt, sand).
- *Mineworkers with other diseases or illnesses.* This includes, but is not limited to, those conditions that impair body temperature regulation (e.g. HIV), or produce fever (e.g. malaria) as described below in the section on “Social and Economic Impacts and Management Measures: Socio-Economic Impacts on Individuals, Households and Communities”.
- *Mineworkers working in open, unshaded areas.* For those working in extraction, hauling and loading, sun exposure is very difficult to minimize (aside from the use of hardhats or other head coverings). However, for those workers engaged in crushing and brick moulding, sun exposure could be mitigated by the use of constructed or natural shaded areas. Despite this, very few mineworkers were observed to take these precautions against sun exposure (Figures 39).



Figure 37: Sand miners out in the sun at Nango beach, Mayuge, Uganda. Photo credit: ECO Uganda



Figure 38: Miner extracting stone aggregate from the cliff without any shade. Lwanda, Masaka, Uganda. Photo credit: Levin Sources



Figure 39: Makeshift shade at stone aggregate mining site Masaka, Lwanda. Photo credit: Levin Sources



Figure 40: Clay miners working in the sun in Kyalusowe, Masaka. Photo credit: Levin Sources

- *Women mineworkers.* Some research suggests that women may be less heat tolerant than men due to a lower sweat rate, although other factors (e.g. age, weight) require consideration²⁵¹. Based on factors described above (location, age, health status etc) women in related groups may be at greater risk.

Avoidance of heat is commonly cited by miners (together with costs) as a justification for not using certain types of PPE that would protect them from other risks (e.g. coveralls, rubber boots, dust masks, gloves). As described above, PPE is extremely underutilized (measures were found in systematic use at only 1 of the 42 sites surveyed), providing some testament to how heat-related factors may impede PPE use alongside other factors. At the Lake Katwe salt works, attempts over the past decade to address the significant health impacts of salt exposure have all largely failed due to the high temperature working environment. At sand and clay sites around the country, young men can be seen regularly working shirtless and shoeless.

Heat-related occupational risks are likely to increase in coming years. Climate change assessments of Uganda estimate temperature increases of 0.8-0.9 °C of minimum temperatures and 1.2-1.4 °C of maximum temperatures in a lower emission (best case) scenario by 2030,

with many models projecting increases of 2 °C²⁵². This heightens the impetus to combat climate change while addressing other factors contributing to heat related risks (e.g. health status of miners, temperature appropriate clothing and other PPE, lack of shade in workspaces, etc).

Noise and Vibration

Although levels of mechanization are low in Uganda's ASM Development Minerals sector, ASM mineworkers nevertheless experience noise and vibration related risks that can generate health impacts. These risks are mainly attributed to rock breaking during excavation and crushing and therefore are most pronounced in stone aggregate and dimension stone quarries, limestone and pozzolana quarries and, to a much lesser extent, in kaolin mines where rock is much softer.

- Mineworkers engaged in crushing rock, approximately 70% of whom are women, are particularly vulnerable due to the long hours spent performing this function.
- Although it poses less of a concern than mechanized rock breaking (e.g. using jack hammers and other percussive tools), exposure to vibration via the repeated action of impacting a rock with a hammer can lead to a condition called Hand-Arm Vibration Syndrome (HAVS). Related symptoms, which occur gradually and worsen in severity over several years, include numbness and loss of feeling in fingers and hands, loss of bone strength, cysts in fingers and wrists and a condition called vibration white finger (loss of colour in fingertips).²⁵³
- Little data exists concerning maximum allowable vibration magnitudes from use of manual hand tools leading to HAVS, although 60% of quarry workers interviewed reported health issues related to muscle, joint and back pain.

²⁵¹ CCOSH, 2017a.

²⁵² Caffrey, P., Finan, T. et al, 2013, Uganda Climate Change Vulnerability Assessment, USAID Report, 78p.

²⁵³ Canadian Center for Occupational Health and Safety (CCOHS), 2017b, Factsheet: Vibration – Health Effects, https://www.ccohs.ca/oshanswers/phys_agents/vibration/vibration_effects.html

- As the noise and vibration have the same exposure pathways, they can have a combined health impact on those engaged in crushing. Some studies have found a higher incidence of hearing loss for those with vibration white finger, despite exposure to the same noise levels, suggesting individual factors (e.g. how hard tools are gripped) may be a factor.²⁵⁴
- Whole Body Vibration (WBV) is mainly an issue for drivers of lorries transporting mineral commodities, particularly where road conditions are poor, and drivers of forklifts, excavators or bulldozers, which are mainly found in more medium and large-scale operations (e.g. Butende Brickworks, Nkozi Clays, Hima Cement Ltd.).



Figure 41: Miner uses a rock to crush stone into aggregate near Kasese town. Photo credit: Levin Sources

Biological Hazards and Risks

The most common biological hazards and risks at Development Minerals sites are associated with poor sanitation and hygiene, prolonged immersion in water and increased risks of parasitic diseases (e.g. malaria, bilharzia). Although it is less commonly reported, risks associated with wildlife add to the burden of risks faced by the ASM Development Minerals workforce.

Sanitation and Hygiene Related Risks

Uganda experiences a large burden of sanitation and hygiene related disease, with 89,000 cases and 3,000 deaths per annum due to cholera. Typhoid cases are on the rise with over 69,000 reported in 2014 and over 40,000 cases of suspected bloody diarrhoea in 2014²⁵⁵.

Many ASM sites throughout Uganda exhibit multiple risk factors for cholera, typhoid, dysentery and other diarrheal disease and illness. These factors include large numbers of persons concentrated within an area (in this case mineworkers, traders and others passing through ASM sites), lack of sanitation facilities and clean water, poor food handling practices and poor personal hygiene practices.²⁵⁶

Although miners from only 11% of ASM sites surveyed reported diarrheal diseases as one of the sources of lost workdays, prevalence is expected to be higher due to the following factors:

- *Lack of Toilet Facilities.* Open defecation is the only option at many sites, where the workforce must rely on the bush, forests, rivers or abandoned pits in lieu of toilet facilities. Only 63% of sites surveyed had on-site pit latrines. At Lake Katwe salt works, the local municipal government constructed a bank of pit latrines in the main market area at the salt lake, however the ASM workforce (over 13,000 in the dry season) is dispersed around the 7km perimeter of the lake and pans extend to up to 200m into the lake in some places.

²⁵⁴ Ibid.

²⁵⁵ Opi, A., (2015) Expert's Viewpoint: Epidemiological Profile of Waterborne Diseases in Uganda and Ministry of Health's Response & Preparedness, Presentation, 24 p.

²⁵⁶ MEMD (2009a)

- *Lack of Handwashing Facilities.* Most sites rely on standing water in abandoned pits and local rivers for washing throughout the day and at the end of shift. 68% of sites surveyed indicated that no washing was done on site and 54% of sites indicated that the nearest water source was more than 1km away.
- *Lack of Refuse Facilities.* A large proportion of ASM sites were observed to be relatively free of rubbish, in many cases likely as a consequence of lack of consumption of disposable items. At some sand sites, alcohol (“waragi”) sachets were observed strewn around the site, providing an indication of alcohol consumption by mine workers. Only 7% of sites surveyed had specific locations designated for rubbish disposal.
- *Lack of clean drinking water and hygienic food preparation.* Although some miners reported carrying jerrycans of water for drinking purposes, most lack drinking water on site. Food is also sold in 25% of ASM sites, providing an employment opportunity for women, but often without adequate facilities (wash water etc) as needed.
- *Workforce in-migration.* Higher risks of diarrheal diseases are associated with in-migration of populations from DRC, South Sudan and Kenya, resulting in the distribution of disease shown in Figure 41²⁵⁷. Although the majority of the ASM Development Minerals workforce originates from within the district where they are working (See section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Artisanal and Small-scale Mining Businesses”), immigration related risks exist in Western Uganda, including Lake Katwe, which experiences a biannual increase in cholera cases coinciding with the seasonal influx of salt mineworkers²⁵⁸. Given that initial entry to ASM does not require considerable skill or even tools, in-migration related health risks require further evaluation at Development Minerals sites across northern Uganda²⁵⁹ in particular, where an estimated one million displaced men, women and children from South Sudan have come to the area.
- *Climate related risks.* Increased rainfall and temperature expected as a consequence of climate change are likely to increase the incidence of these diseases in the future.



Figure 42: Map of Reported Incidence of Cholera by hospitalized cases (2005-10)
Source: Bwire et al, 2013.

²⁵⁷ Bwire, G., Malimbo, M. and Maskery, B., 2013, The Burden of Cholera in Uganda, PLoS Neglected Tropical Diseases

²⁵⁸ Hinton, J., Kyakonye, F., Besigye, P. et al, 2006.

²⁵⁹ WSP (2012) Economic Impacts of Poor Sanitation in Africa, 6p.

As shown in Figure 45, children under 15 years of age bear a significant proportion of the cholera disease burden (39%). This also applies to other diarrheal diseases. Affirming the increased vulnerability of children under 5 years of age, this group constitutes over 85% of the estimated 23,000 diarrhoea disease associated fatalities per annum in Uganda. Although community health risks for children are already very high, those present at ASM sites, working or otherwise, are exposed to greater risks than normal by exposure to many of the same risks faced by adult mine workers (risks of injury, exposure to the sun, lack of sanitation, etc).

Prolonged Immersion in Water

Frequent and/or prolonged immersion in water is a most severe issue at Lake Katwe salt works, where mineworkers can spend several hours immersed to waist level (when harvesting from pans) or chest deep (when collecting rock salt). Biological risks also exist for clay and sand miners that are partially immersed in water, particularly when work continues throughout the rainy season.



Figure 43: Salt pans in Lake Katwe, Uganda. Prolonged immersion in water for salt miners carries problematic health risks. Photo credit: Levin Sources

The presence of parasites and burrowing insects can result in skin rashes, infections and illnesses such as hookworms and bilharzia, the latter of which was reported by mineworkers as one illness resulting in lost workdays at 11% of sites assessed. Compared to sand and clay mining areas, this is expected to be less pronounced in Lake Katwe and other salt production areas (e.g. Kisenyi in Kasese) where brine conditions render the water inhabitable for many organisms.

Particularly given lack of toilet facilities, mineworkers immersed in waters for period throughout the workday seem to be at greater risk of contracting sewage and therefore could experience higher incidences of cholera, typhoid and other diarrheal diseases.

Wildlife Related Risks

Snake bites were cited as one of the main causes of injuries at only two clay and sand sites surveyed. Attacks by wildlife have been reported at Lake Katwe, which is a degazetted area encircled by Queen Elizabeth National Park. In 2005/6 they were cited as the cause of 7-10 fatalities per annum in the town around the salt lake.²⁶⁰

Chemical Hazards and Risks

As no chemicals are used in extraction or processing of artisanally-produced Development Minerals, and most ASM Development Minerals sites have low-to-no degrees of mechanization, exposure to diesel, lubricants and other chemicals used for operations is expected to be minimal for most Development Minerals commodities. The only exceptions are a limited number of operators with small stone cutting machines producing square and rectangular tiles, mainly in and around Kampala, a practice which is likely to grow as market demand increases.

²⁶⁰, J., (Hinton 2011)

Chemical exposures resulting in occupational illness are mainly associated with limestone and lime production (especially quicklime) and salt exposure (Katwe). Mineworkers producing both commodities work in extremely alkaline working conditions and chemical reactivity produces a range of health impacts.

Limestone and Lime. Burning (calcination) of limestone results in the production of highly reactive quicklime, which is an extremely caustic scavenger of moisture. Prior to and during hydration of quicklime, miners are particularly susceptible to blistering and burning of skin and mucous membranes (e.g. lips, eyes). Sieving and bagging of hydrated lime also produces serious health impacts (including through silica exposure. Ugandan lime producers cite “scorching” and burning of skin, particularly in reaction to sweat, as well as cough as health concerns.

Salt. Given prolonged daily exposure to brine waters with a pH in excess of 9.5 at Lake Katwe together with wounds associated with carrying and stepping on coarse rock salt, both women and men mineworkers frequently report slow healing sores and damage to mucous membranes, including eyes, lips and genitalia. Women mineworkers report high rates of miscarriage and infertility while some men report deformed genitalia.²⁶¹ Temperatures that can exceed 40 C in the dry season strongly discourage the use of PPE (e.g. rubberized clothing) to reduce exposures and local miners are forced to improvise, using rubber tubes, socks, buveera (plastic bags), condoms and other measures to protect their private parts and treating skin wounds with contact cement prior to entering the water.

Equipment, Tools and Installation Hazards and Risks

Given minimal levels of mechanization and electrification, main related health risks are associated with tools that are poorly maintained or carelessly used. Resulting health impacts from wooden handles of tools splitting or pickaxe or sledgehammer heads flying off, for example, can include minor to serious wounds and injuries, in particular to limbs (e.g. hands, arms, feet). Accidents with tools were reported as one of the main causes of injuries at 72% of the clay, sand and stone sites surveyed, and in some cases were linked to working under the influence of alcohol or drugs.



Figure 44: Common tools in stone quarries. Kabale.
Photo credit: Levin Sources

Given a potential increase in mechanisation of activities at ASM Development Minerals sites, greater attention to safe use and maintenance of machinery will be needed to minimize risks of severed or wounded limbs, electrocution and other injuries.

²⁶¹ Hinton, J. (2011); Hinton, J., Kyakonye, F. and Besigye, P., (2006)

Ergonomic Hazards and Risks

One of the most common causes of occupational injury and illness in Development Minerals is associated with jobs and work functions that require repetitive motions (e.g. crushing rock), high exertion activities (e.g. breaking or hauling rock) and repeated or sustained awkward postures (e.g. not taking appropriate care when lifting and carrying). Health impacts can include fatigue and exhaustion, musculo-skeletal disorders, pinched nerves, muscle sprains and tears, and other illnesses and injuries. Resulting chronic or acute illness, injury or fatigue can result in lost work days and, in some cases, lead to permanent disability.

Ergonomic hazard and risk factors were observed in all Development Minerals sites assessed and backpain and fatigue, in particular, were cited by mineworkers at multiple sites as a cause for lost workdays. In the case of one sand mine in Masaka District, some miners work on a one week on, one week off rotation due to fatigue caused by the heavy workloads. One elderly stone quarry miner in Central Uganda reported and visibly exhibited severe hardening of muscles due to almost 50 years of strenuous work in the same stone quarry.

Stress Related Hazards and Risks

Psychosocial stress can produce a range of negative impacts in ASM including, but not limited to, depression, low self-esteem, social exclusion and stigmatization, alcoholism, drug abuse, conflict, marital discord, insomnia and exhaustion, loss of appetite and malnutrition, and other resulting illnesses and injuries.²⁶² In the context of ASM of Development Minerals, additional stress can be anticipated in association with day to day and seasonal fears experienced by miners that can exacerbate hardships: fear of eviction and exploitation, fear of little or no sales and fear of injuries and illness, among others. Outcomes of psychosocial stress can be made worse by other health impacts of ASM.

The most commonly observed and reported concerns in ASM of Development Minerals are highlighted below.

Alcohol and Drug Abuse

Contrary to national statistics indicating that prevalence of medium to high levels of alcohol consumption is higher in older populations compared to youth²⁶³, alcohol (as well as drug abuse) is often associated with disenfranchised young men in ASM workforces. Although likely an issue at most sites, alcohol and drug abuse does appear to be more pronounced in mines where the workforce is comprised of higher proportions of young men, as found in clay and sand mines, although the gender composition of the workforce also likely plays a role (See section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Artisanal and Small-scale Mining Businesses"). Sand miners at sites in Central Uganda have cited intoxication of workers as a cause of accidents and empty sachets of waraji (local gin) were most

²⁶² Dreschler, B., Hinton, J. and Walle, M., (2010), *Occupational Safety and Health Systems in Small Scale Mines, Policies and Guidelines for Small Scale Mines in Rwanda*, Report to BGR and OGMR, 78p.

²⁶³ Kabwama et al (2016) found increased prevalence of medium to high levels of alcohol consumption with age (13.2% among 18–29 year olds and 25.4% in those aged 50–69 years).

commonly observed at sand and clay mines in Central and Southwestern Uganda. Within the general population, prevalence of medium to high levels of alcohol consumption is considerably higher among men (25.9%) than women (14.3%).²⁶⁴

Regional differences may also play a role. Within the general population, the prevalence of medium- to high-levels of alcohol use is highest among residents in the Northern Region (23.2%), followed by the Western (21.4%), Central (18.5%) and Eastern (13.7%) regions of the country²⁶⁵. This is consistent with the often cited, widespread alcohol abuse in limestone and marble quarries in the Karamoja Sub-region, where many miners report drinking throughout the day to mitigate harsh working conditions and hunger²⁶⁶. As one local official stated "*Our people are dying (from over-drinking)... that's what they get from the stones.*"²⁶⁷ Alcohol and drug abuse both during the workday and within the community can result in a host of consequences for Development Minerals operations and communities. These include violence, conflict, domestic abuse, liver disease and other physical illnesses, depression, increased risks of accidents, absenteeism and loss of income and high risk sexual behaviour (potentially resulting in HIV/AIDS and other STDs), among others.

Sexual and Gender Based Violence

Sexual and gender based violence (SGBV) includes different forms of physical, sexual, psychological and socio-cultural violence that represents an abuse of power imbalances directed at individuals on the basis of gender. SGBV comes in many forms and consist of multiple actions, behaviours and practices used as a means to reassert power and ensure individuals conform with what is considered appropriate for their gender.

Although both males and females can be subjected to SGBV, women tend to be disproportionately at risk. Within Uganda's Development Minerals sector, gender imbalances in power are strongly indicated by the significantly lower incomes, bargaining power and status of women in the mines (few hold positions of authority as site or land owners, team or association leaders). A comprehensive survey of incidences of SGBV in Uganda's ASM Development Minerals sector has not been conducted, but the following examples provide an indication of related risks and impacts:

- *Stigmatization*: In the Lake Katwe salt works, widespread beliefs about rates of miscarriage and infertility due to salt exposure have created a group of stigmatized young, single women miners who reportedly have difficulty finding husbands²⁶⁸. Multiple women have reported stigmatization by their husbands due to their rough, calloused hands and they "*get old fast*" from working in the limestone and stone aggregate mines, and in some cases is used by some men as a justification to visit "*malayas*" (sex workers), pursue younger women or abandon their wives²⁶⁹.

²⁶⁴ Kabwama, S.N., Ndyabangi, S., Mutungi, G., Wesonga, R., Bahendeka, S.K., and Guwatudde, D., (2016) Alcohol use among adults in Uganda: findings from the countrywide non-communicable diseases risk factor cross-sectional survey, *Glob Health Action*. 9:10.

²⁶⁵ *Ibid.*

²⁶⁶ J. Hinton I Kabongo, C Kabiswa. et al. (2011)

²⁶⁷ *Ibid*, Page 56.

²⁶⁸ Hinton, J. et al. (2011)

²⁶⁹ Hinton, J. (2011)

Stigmatization of women working in mines by family and community members has also been widely documented in ASM in the region, mainly as others can associate work in mines with the sex trade.²⁷⁰

- *Exploitation*: Both women and men Development Minerals miners have cited incidents of exploitation to include non-payment by traders, exploitation and eviction by some authorities (e.g. police pretending to be environment police) and unwarranted demands for payment increases by landowners. Whether women are disproportionately targeted in these cases is unknown, however, gender disparities in power suggest a high likelihood.
- *Public Humiliation and Embarrassment*: Although not reported or observed during the course of field assessments, public challenges to the masculinity of young men, in particular, has been observed on ASM sites in East and Central Africa as a means to incite risk taking behavior, particularly in extraction. In addition to psychological impacts of humiliation, this seems to be a factor in high risk practices (e.g. undercutting rock, hauling overly heavy loads) with potentially serious physical consequences.
- *Sexual corruption*. This involves threats to withhold a benefit or promises to provide a benefit (such as access to a mining area, full payment for crushing services or avoidance of a fine by authorities) in exchange for sexual services. Such incidents have not been well documented in Uganda's Development Minerals sector but have been reported in ASM sites throughout East and Central Africa²⁷¹ and within other sectors of Uganda's economy (e.g. restaurants, government offices, schools). These circumstances, combined with gender imbalances in power increase the likelihood of sexual corruption within Development Minerals operations.
- *Other forms of sexual and physical violence*. Incidences of sexual harassment, inappropriate touching, rape, molestation, beating, slapping, kicking and other forms of abuse have not been well documented in the sector but numerous risk factors are present in many sites. In stone quarries in Muyenga, for example, a large proportion of women were comprised of severely impoverished economic migrants from northern Uganda with few social ties in Kampala. Other determinants include lower levels of education and income, which increase the vulnerability of certain women in mines (See section below on "Social and Economic Impacts and Management Measures").²⁷²

In addition to asserting and reinforcing men's dominance over women, SGBV results in a multitude of immediate and long-term physical, psychological and sexual impacts. These can include: death, physical injuries, sexual and reproductive health issues (HIV/AIDS and other STDs, high risk and unwanted pregnancies), chronic health problems (e.g. gastrointestinal illnesses, depression and other stress related illnesses), low productivity and resulting effects (e.g. reduced

²⁷⁰ Hinton, J. (2016): *The Gender Dimensions of Tin, Tantalum and Tungsten Mining in the Great Lakes Region*. Gender Resource Facility. The Hague (NL)

²⁷¹ *Ibid.*; Hinton, 2017.

²⁷² Nayiga, J., (2009) *Prevalence and Determinants of Sexual Violence in Uganda*, presentation, www.svri.org/forums/forum2009/presentations/Nayiga.pdf.

incomes), anxiety, fear, mistrust, depression, reduced self-esteem, alcohol and drug abuse and post-traumatic stress disorder, among others²⁷³. Broader impacts can also include increased vulnerability to other types of SGBV (including stigmatization by families and communities), absenteeism and reduced productivity and incomes.

Long Work Hours

Both women and men miners were found to work excessively long hours. Within stone aggregate, dimension stone and sand mines, men and women miners work on average 9.5 and 9.8 hours per day, respectively. In clay mines, women and men both work 10.5 hours per day on average while in limestone and salt, most miners work about 8 hours per day. Most miners work 6 days per week although, at some sites, they work 7 days per week.



Figure 45: Miners often work very long days. Lira.
Photo credit: ECO Uganda

Impacts of overly long working hours include exhaustion and fatigue, depression and a range of physical health effects due to increased risks of cardiovascular disease, musculoskeletal disorders, chronic infections, diabetes and death²⁷⁴. Those working excessive hours may additionally be prone to occupational accidents, injuries and illness, with one 13-year, multi-occupation study determining work in excess of 60 hours per week was associated with a 23% increased hazard rate²⁷⁵. As this study was undertaken in the US, where occupational management standards tend to be much stricter, occupational risks could be even greater in the context of Development Minerals in Uganda.

Impacts from long working hours are expected to be more pronounced for women mineworkers than men. In 2008 consultations with female and male miners engaged in salt, limestone, stone quarries, dimension stone and sand production in Uganda, found that women's work burdens far exceed those of men. In addition to their commercial roles, women miners spend, on average, an additional 8 hours daily on domestic functions including childcare, fuelwood and water collection, food preparation, washing clothes, tending to the elderly and sick and cleaning²⁷⁶. Time spent by men on non-commercial roles amounted to 3 hours per day on domestic chores with an additional 7-8 hours spent on social activities.

OSH Risks to and Impacts on Children

As outlined in the sections on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition: Children" and "Environmental,

²⁷³ Minnesota Advocates for Human Rights, (2003) Causes and Effects of Gender Based Violence, www.stopvaw.org.

²⁷⁴ Dembe, A.E., Erickson, J.B., Delbos, R.G. and Banks, S.M. (2005) The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States, *Occup Environ Med*, 62:588–597.

²⁷⁵ Ibid.

²⁷⁶ Hinton (2009)

Occupational and Social Impact Analysis: Social and Economic Impacts and Management Measures: Socio-Economic Impacts on Individuals, Households and Communities: Child Labour and Child Rights”, boys and girls perceived to be under the age of 15 years were observed on many of the mine sites, sometimes not working but accompanying parents or guardians, looking after younger children, performing light work such as carrying small amounts of water or wood, or performing work that may be deemed as harmful and hazardous.

Although the vast majority of children observed at the mine sites were not working, there are still OSH risks associated with their presence at the mine site, such as high exposure to dust or accidental injury. Working and non-working children in ASM face the same occupational health hazards as adults but are generally more susceptible to risks of illness, injury and fatality due to the rapid rate of their physical and psychological development, as described below. Some effects on children’s development may not appear until long after exposure. The main concerns in the context of Uganda’s Development Minerals sector include the following:

- Because children eat, drink and breathe more than adults on a per kilogram weight basis and are less efficient at detoxification²⁷⁷, they are more susceptible to impacts of dust exposure. Both boys and girls under 15 years of age have been observed crushing, sieving and/or (mainly for boys) loading silica-containing materials as found in a number of Ugandan sand, pozzolana, clay bricks and stone aggregate mines as well as in harvesting of salt.
- For the same reasons, children are also more prone to contract diarrheal diseases associated with poor sanitation and hygiene at many ASM sites. As shown in Figure 45, children under 15 years of age bear a significant proportion of cholera disease burden (39%), an outcome that extends to other diarrheal diseases. Affirming the increased vulnerability of children under 5 years of age, this group constitutes over 85% of the estimated 23,000 diarrhoea disease associated fatalities per annum in Uganda.²⁷⁸
- Damage to musculoskeletal systems can impair the normal growth and development of children and lead to long-term, chronic pain and illness²⁷⁹. The main risks to children in Uganda’s sector are associated with crushing rock and hauling heavy loads, the

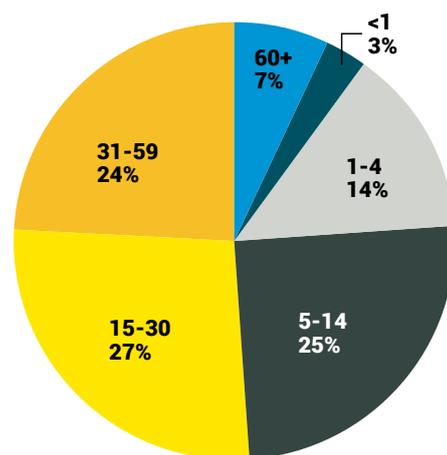


Figure 46: Age distribution of cholera cases in Uganda. Source: Bwire et al, 2013.

²⁷⁷ World Health Organization (WHO). (2005) Issue Brief Series: Lead, Healthy Environments for Children Alliance Factsheet, <http://www.who.int/heca/infomaterials/lead.pdf>, 2p.

²⁷⁸ WSP (2012)

²⁷⁹ Wasserman, E. (1999) Environment, Health and Gender in Latin America: Trends and Research Issues, Latin American Research Issues, Environmental Research Section A, 80: 253-273.

latter of which can lead to compression of the spine. Hardening of muscles has been observed in children as young as 5 years old in stone quarries around Kampala.

- Under – nutrition due to long hours at the site without adequate food.
- Denial of the right to education, whilst in some cases ASM enables families to pay the hidden costs associated with schooling, and therefore precludes them from attending school, in many cases a child's presence at the mine site precludes their presence at school, posing a risk to their education.
- With less experience in mining, a comparative lack of maturity, and, in some cases, potentially little guidance from adults, children may also be more prone to accidents than adults.

Current Use of Mitigation and Management Measures

Few ASM Development Minerals sites employ any measures to prevent, control, manage or mitigate the serious OSH risks posed by the sector. In many sites, mineworkers often perform tasks and functions without shoes, thus the absence of PPE (e.g. dust masks, gloves etc) is unsurprising. Some improvements were observed at more formal sites (e.g the Kibalya Kaolin Mine where most workers are equipped with gumboots and hardhats). The difference between "formal" and "informal" sites is most pronounced at industrial operations, where signage is abundant, all on-site workers are generally well equipped with adequate gear and engineering controls (e.g. scrubbers for air emissions, noise guards on crushers) are readily observable.



Figure 47: Development Minerals miners often work use little or no PPE. Kabale. Photo credit: Levin Sources

Social and Economic Impacts and Management Measures

Linkages between economic and social impacts range from implications on quality of life and living standards to access to education and health care to the revenue generation and use by local governments, among others. At a national level, GDP contributions, reductions in trade imbalances through reduced reliance on imports, increased Government revenues (e.g. VAT, local levies) and opportunities to generate multiplier effects, mainly through indirect and induced employment, also have significant implications on human development.

The follow section addressed social and economic impacts and related management measures at a micro-level and at a macro-level. Both positive and negative impacts are examined.

Socio-Economic Impacts on Individuals, Households and Communities

The ASM Development Minerals sector employs some of the most vulnerable people in Uganda, who are often driven into it by poverty and food insecurity. Elevated levels of informality in the sector mean that its workforce, and the socio-economic factors that influence them, are largely invisible. This low profile means that the sector's positive impacts are generally not acknowledged, and that its negative impacts are often not addressed.

In terms of positive impacts, as described in the section on "Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition", the sector is estimated to employ approximately 390,000 people countrywide, and contributes 84% of the total value of Development Minerals produced in Uganda. However, individual benefits are low, and large proportions of the workforce are not able to decrease their vulnerability levels, which largely relate to constraints to access: access to information and education, access to informal channels (e.g. by gender, kinship or political affiliations), access to formal channels (e.g. awareness of procedures, financial resources for transport and other costs), access to capital and credit; access to psychosocial support; and access to decision-making processes²⁸⁰. The sector is also burdened with issues of child labour, gender inequality, environmental devastation, poor health and safety, migrant workers, lack of capital and fair markets, as well as conflicts within mining communities and with landowners.

Diversification of Livelihoods

Many of those who currently participate in the Development Minerals sector do so in response to poverty and/or unexpected hardship²⁸¹. In a context where nearly 75% of the workforce are employed in agriculture²⁸², poverty and hardship tend to be linked to high levels of food insecurity. ASM becomes, then, one of the only available sources of income, and therefore means of survival, for many of its workforce.

As discussed in the section on "Profile of the Development Minerals Sector", levels of dependency on the Development Minerals sector differ regionally and by commodity, and sometimes even within mine sites, depending on the individual contexts of ASM miners. For nearly 14% of those involved in the Development Minerals sector, mining is their only source of income. Findings show that participation in the ASM sector can bring diverse benefits to its workforce, including the possibility of an income for the most vulnerable in society, and



Figure 48: Small-scale agriculture managed by a former limestone miner, in Kasese. Photo credit: Levin Sources

²⁸⁰ Hinton et al. (2006)

²⁸¹ Human Rights Watch (2014) "How Can We Survive Here?": The Impact of Mining on Human Rights in Karamoja, Uganda. Accessed October 3rd, 2017. <https://www.hrw.org/report/2014/02/03/how-can-we-survive-here/impact-mining-human-rights-karamoja-uganda>; ECO (2011)

²⁸² UNData. Uganda Country Profile.

sometimes a higher income than in other sectors. However, despite these benefits, a total reliance on ASM can actually increase vulnerability to poverty through increased food insecurity, poor health status of those engaged in ASM, social problems (e.g. related to alcohol abuse and HIV/AIDS), environmental degradation, and intensified income inequities²⁸³. Diversification, therefore, is essential to increasing the resilience of ASM sector stakeholders to poverty.

Fortunately, livelihood diversification is already commonplace in the Development Minerals sector. The trends and impacts of diversification on the Development Minerals workforce vary, and are presented below:

Seasonality is a key factor in diversification of livelihoods away from or towards the Development Minerals sector. In many cases, it is much more difficult and expensive to mine for Development Minerals in the rainy seasons, during which many sites see as much as a 50% reduction in the workforce. Flooding of mine sites (especially clay and sand) and the washing away of produce (especially salt and kaolin) are also challenges faced by miners in the rainy seasons. Moreover, difficulty of access to the sites for traders and transporters, who cannot bring large trucks down flooded unpaved roads, is another significant challenge. In the wet season, transporters charge more for their services, increasing the price of production of the commodities, costs of which are often pushed down to miners. This increase in costs, even if marginal, can reduce the viability of the production of Development Minerals. Furthermore, in the rainy season, rates of construction decrease, causing a fall in the demand for construction minerals. This change in demand particularly affects the clay, sand and stone aggregate sectors, as these materials are generally used directly in local construction. The seasonality of farming is also a factor, with many miners choosing to mould their work schedule at the mine site around the planting and harvesting seasons.

In some cases, people diversify out of necessity. In many cases, people turn to mining because other activities have failed to provide sufficient income for survival. In Moroto, Karamoja, for instance, where in 2006 many people had lost agro-pastoral livelihoods to cattle rustlers and were suffering from the effects of a three-year drought, marble mining was a means of survival, along with aid distributed by the World Food Programme (WFP). This shows the positive impact that the ASM sector can have for the most vulnerable.

In other cases, miners diversify away from ASM into alternative activities. For example, when salt prices plummeted in the years leading up to 2006, salt miners at Lake Katwe began to engage in other activities such as fishing, trading, cotton growing and livestock rearing to supplement their incomes²⁸⁴. Similarly in the subcounties of Rupa and Tapac in Karamoja, whilst the main economic activity is the mining of marble and gold, incomes are supplemented by agriculture, firewood collection and charcoal production. These alternative activities are mostly performed by women and at times when the gold and marble prices have fallen drastically²⁸⁵. Due to gender inequality in the ASM sector, women tend to be less resilient than men, increasing their vulnerability to external shocks and therefore also increasing their need to diversify in times of hardship.

Conversely, diversification can also be a product of plenty. In Kasese incomes from the limestone industry in 2006 were much higher than the average income from other sectors. This allowed miners to diversify into cotton, aloe vera and small-scale forestry, not out of desperation but in

²⁸³ Hinton et al. (2006)

²⁸⁴ Tuhumwire and Hinton (2006)

²⁸⁵ ECO (2015)

order to increase their resilience to future external shocks²⁸⁶. Evidence of the benefits of this diversification in Kasese was observed this year by the research team. The team interviewed the owner of a former artisanal lime kiln, who had invested in small-scale agriculture and forestry as a strategy for building income resilience. Currently, at a time when the market for artisanal lime is almost non-existent, the kiln is not operational and he depends solely on the plantations he invested in using profits from ASM.

ASM organisations can also provide a platform for the diversification of livelihoods of their members. The Jambula Youth and Elders Development Society in Kasese participates in both the Development Minerals and agricultural sectors, participating in brick laying, a plant nursery, sand mining, a washing bay and the loading and offloading of sand and bricks. Members of the society, and even non-members, can participate in the variety of activities, reducing their vulnerabilities and better equipping them to accumulate the assets needed to escape the poverty cycle.



Figure 49: Plant nursery managed by Jambula Youth and Elders Society. Kasese. Photo credit: Levin Sources

It is clear, therefore, that whilst ASM can be beneficial to those who work in it, total reliance on the sector for income can be dangerous. However, findings show that the diversification of livelihoods in the Development Minerals sector is commonplace in Uganda. It is also clear that, although lack or loss of other livelihood opportunities often drives people into the Development Minerals ASM sector, ASM can in turn facilitate the re-diversification back into other sectors or family needs such as education and healthcare²⁸⁷ by providing people with the up-front capital needed to invest in them. In other words, not only can ASM provide a much-needed strategy for survival at times of intense hardship, it can also be transformed into a “platform for wealth accumulation and a catalyst for local economic development”.²⁸⁸

Education Status

Education is vital to escaping the poverty cycle at individual, household and community levels. Recent years have not seen gross enrolment ratios in Uganda rise. Primary enrolment ratios dropped significantly from 2009 to 2014 from 136 to 117. Enrolment also varies hugely by district, with differences of 195 percentage points from the lowest to the highest districts in 2009 (45.5% in Kotido and 231.43% in Abim). Whilst figures over 100% mean that enrolment is high, they indicate that a large number of children are not enrolling in primary school at the proper ages, as well as a potential influx of non-Uganda children who were not taken into account in the population censuses.²⁸⁹

²⁸⁶ Tuhumwire and Hinton (2006)

²⁸⁷ Ibid.

²⁸⁸ ECO (2011)

²⁸⁹ UBOS (2009). Uganda Education Statistical Abstract. Online at <http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/PNSD/2009EducStatAbst.pdf>

Secondary enrolment, whilst remaining very low, saw a rise of 2 percentage points, from 28 to 30%, in the same time period. Enrolment rates also vary by district, from 3.7% in Nakapiripirit to 56.7% in Mbale)²⁹⁰. The dropout rate from primary to secondary school can be largely attributed to hidden school costs such as a paper, books and uniform, as well as poverty driven requirements for children over a certain age to contribute to the income of their families.²⁹¹

The ASM sector in general, and the Development Minerals sector in particular, can have both positive and negative effects on the education rates of its workforce. On one hand, Development Minerals ASM has been observed to have a negative impact on school drop-out rates in some areas local to the sites, as shown in Bread for All's recent report on child labour in pozzolana mines in the area around Fort Portal, where the majority of children interviewed dropped out of school to work in the mines²⁹². In Kasese, past studies have found that over 70% of mining household members had no formal education or were limited to primary level education, having abandoned prospects of secondary school to work at the mine sites.²⁹³

However, field data found that the Development Minerals sector can also be an enabling factor for school attendance as it generates the income needed to cover school fees and provide for family needs. In some cases, parents or even children themselves worked in ASM (quarries, sand sites, clay sites) only at times when there were school fees to be paid, and participated in alternative livelihoods at other times. Some children work daily in order to be able to pay their school fees, while others work only during the holidays or at weekends. These findings demonstrate the importance of ASM for families' livelihoods and the ability to afford school fees, highlighting that for many, participation in the Development Minerals sector is a strategy for escaping the cycle of poverty by providing an education for themselves (in the case of working children) or their children (in the case of working parents). However, despite this, the ideal solution for families who currently work in the sector would be to earn enough to forgo the contributions of children to the family income. Efforts must be made to build resilience into the livelihoods of the most vulnerable, allowing them to provide adequate support to themselves and their families, particularly in the form of education for their children.

Health Status

Uganda's birth rate is one of the highest in the world with an estimated 5.8 children born per woman in 2016. The rapid population growth rate and young median age (53% between 0-14 years) will put increasing strain on the country's health care systems and threaten economic

²⁹⁰ Ibid.

²⁹¹ United States Department of Labor (2016). Findings on the Worst Forms of Child Labor - Uganda. Accessed October 10th, 2017. <https://www.dol.gov/agencies/ilab/explore-our-resources/reports/child-labor/uganda>.

²⁹² Bread for All (2017). Child Labour in the Supply Chain of LafargeHolcim in Uganda: Unresolved Issues. Accessed October 10th, 2017. <https://brotfueralle.ch/content/uploads/2017/03/Report-on-child-labor-LafargeHolcim-Uganda.pdf>

²⁹³ Tuhumwire and Hinton (2006)

development^{294, 295}. ASM can present additional challenges, including where rates of in-migration to ASM areas is high and can be compounded by a range of occupational impacts.

One of the biggest challenges for healthcare in Uganda is access to the system, and quality of care within the system. Uganda's service delivery indicators show that public providers are able to diagnose only slightly more than half of the tracer conditions set for Uganda as the most prevalent conditions among the population. Findings show that in rural areas the capacity of public providers is much lower than that. Furthermore, the same indicators show that the correct treatment is not always prescribed even when a condition is diagnosed²⁹⁶. Malaria was the least likely condition to be diagnosed and treated correctly across the country, which presents challenges to the Development Minerals sector where 63% sites stated that malaria was the principle non-occupational cause of lost work days due to illness. Bilharzia and diarrhoea were the next two most common non-occupational cause of lost work days, at 19% and 11% of sites respectively.

As reflected in the field findings, ASM Development Minerals sites are at particular risk of certain diseases borne out of the general conditions around sites. Both clay and sand extraction often take place in wetlands, where stagnant water can collect in mine site pits, increasing the risk of malaria. Miners were also observed to be using water sources at the mine site to wash clothes and themselves, as well as using the bush as a latrine. Despite high numbers of miners at some sites, pit latrines were only very rarely observed, except for at sites in the eastern and northern regions. The potential contamination of water sources from human excrement can increase the risk of spreading diarrhoeal diseases such as cholera, dysentery and typhoid, as well as worm infections and bilharzia. Apart from the human cost, open defecation has been estimated to cost Uganda \$41 million USD on access time, premature deaths, productivity loss when sick or looking after others, and health care to treat the diseases²⁹⁷. This figure particularly affects women, who tend to be the ones to look after sick children and elderly relatives, decreasing their productivity levels and the time in which they can earn an income. The above health risks can be exacerbated by the rapid in-migration and population growth that can occur at some mine sites, as observed with the salt mining in Lake Katwe (rapid increase in local population).

Another significant health risk in Uganda and in the Development Minerals sector is HIV/AIDS. The last country-wide HIV/AIDS survey was performed in 2011, although another is due to be performed this year, so current data on HIV/AIDS is not currently accessible. However, social factors in many Development Minerals communities are likely to increase the risk of HIV/AIDS and other STDs in those communities. This is partly due to high population density, a contributing factor to HIV/AIDS rates across Uganda, with the Central regions having the highest rates, followed by the Western regions, and the least populated areas of the

²⁹⁴ Quality of Uganda's Education and Health Services Poses Serious Risk to Long-Term Economic Progress. Text/HTML. World Bank. Accessed November 1, 2016. <http://www.worldbank.org/en/news/press-release/2013/11/19/quality-uganda-education-and-health-services-poses-serious-risk-long-term-economic-progress>.

²⁹⁵ World Bank Data (2015). Accessed 7th October 2017 at https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=UG&year_high_desc=true

²⁹⁶ Wane, W and Martin, G (2013). Education and Health Services in Uganda. The World Bank. Accessed 7th October 2017. <http://documents.worldbank.org/curated/en/680381468174903963/pdf/826660ESW0Ugan090Box379862B000U0090.pdf>

²⁹⁷ World Bank Water and Sanitation Programme (2012). Economic Impacts of Poor Sanitation in Africa. Accessed 7th October 2017. <http://www.zaragoza.es/contenidos/medioambiente/onu/825-eng-v14.pdf>

Northern and Eastern regions having the lowest rates²⁹⁸. Moreover, communities that are both male-dominated and have a young population who have access to disposable income (such as earnings from mining) are more at risk of high HIV/AIDS rates. Previous studies have estimated the prevalence of the disease is higher in mining communities (for example Katwe and Muhokya)²⁹⁹ than in their surrounding areas.

Public Services and Infrastructure

Access to public services and infrastructure is important when considering the socio-economic status of and benefits received by the Development Minerals ASM workforce. Public infrastructure in Uganda consists of health centres, schools, transport facilities, churches, banks and many more, although this study focuses on three basic development indicators which relate to public services, being access to health, to education and (physical) access to employment. Whilst statistical data was not collected on the subject, the following findings have been drawn from a combination of observation during fieldwork and secondary data sources.

Health Facilities

Health facilities in Uganda include hospitals and health centres, of which there were 5,229 functional entities as of June 2013, although almost a quarter of these were located in Kampala. Aside from Kampala, the districts with the highest numbers of health facilities (more than 100) included Wakiso, Jinja, Kabale and Kasese.³⁰⁰

Access to health facilities is an important factor when discussing a sector that contains many of the most vulnerable people in Uganda. The national median distance travelled to a government clinic when someone first fell sick is 3km – the majority (60%) of Ugandans reached the nearest health centre on foot.³⁰¹ For Development Minerals mining regions, availability of health facilities was relatively high - although statistical data was not collected on the subject, 92% of the nearest villages or towns to the mine sites were observed during field work to have a health centre of some kind, and 21% were observed to have a hospital. However, the average distance of a mine site to the nearest health centre is further than the national median at 4.27km³⁰², and, as discussed below, diagnosis



Figure 50: Many sites are remote and difficult to access by road. Masaka. Photo credit: Levin Sources

²⁹⁸ Republic of Uganda (2014). HIV and AIDS Uganda Country Progress Report. Accessed 7th October 2017. http://www.unaids.org/sites/default/files/country/documents/UGA_narrative_report_2015.pdf

²⁹⁹ Hinton (2006)

³⁰⁰ UBOS (2015a)

³⁰¹ UBOS (2015b). National Service Delivery Survey. Accessed October 20th, 2017. <http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/2015%20NSDS%20report.pdf>

³⁰² This average excludes pozzolana, of which only one site was assessed and represented an anomaly in terms of distance to health centre.

and treatments rates are poor across Uganda, and this poses a significant challenge to a sector where OSH risks can be extremely high.

Schools

Gross primary school enrolment in Uganda is at 117%³⁰³, although rates vary hugely by district and region. The mean distance travelled by day pupils to school is 2.4km, well within the distance deemed acceptable by the Ministry of Education and Sports and government targets, who have set 3km as a maximum threshold.³⁰⁴

In terms of the Development Minerals sector, 75% of towns nearest to the mine site were observed during the fieldwork to have a primary school and 46% a secondary school, although, again, statistical data was not collected on the subject. Seeing as the vast majority of respondents were found to live in the immediate vicinity of the site, and that sites were on average 2.4km distance from the nearest town or village, the data can be inferred to show that at least 75% of children from mining households are in line with national averages on distance to primary school, and 46% for secondary school.

Roads

Road access is of primary importance to the Development Minerals sector. Most minerals are transported from the mine site in large trucks, that must be able to access the mine site directly. This means that road access to sites must be in good enough condition to support these trucks. Barriers in access to the mine site can undermine the whole supply chain by making the transport of minerals unfeasibly expensive, and are a primary reason for the seasonality of the sector, as discussed in the section above on "Education Status". The need for reliable roads in all seasons, then, is paramount.

The total length of Uganda's road network is 151,000km, 3% of which is paved, a figure that increases on a yearly basis. For 5% of Ugandan households, the nearest road is a tarmac trunk road.³⁰⁵ For Development Minerals mine sites, however, the ratio of paved to unpaved roads is much higher than the national average, with the route to 24% of the sites visited during the study being paved. A further 62% can be accessed via a good to fair murrum road, while only 14% of the access roads are murrum and in poor (dry season) condition. The conditions of the murrum roads is likely to be much worse, if not impossible, in the wet season. The high proportions of Development Minerals mine sites that can be accessed by paved roads highlights the possibility that sites are created specifically in places where access is already good. It is likely that, as the road network in Uganda improves, this will be a growth opportunity for the Development Minerals sector.

Conflict

Mining-related conflicts occur throughout Uganda, and are not limited to the Development Minerals sector. However, conflict is a common phenomenon in the sector, and any interventions must take care to be conflict-sensitive, paying particular attention to the social and environmental impacts that can be caused by mining-related conflicts.

³⁰³ A figure of over 100% indicates that children are not going into the correct age groups at school, or that some children attending schools are not Ugandan and therefore not registered as a primary-age child.

³⁰⁴ UBOS (2015b)

³⁰⁵ Ibid.

Despite the increasing demand for and awareness of Development Minerals and the significant ASM workforce of the sector, the research team did not come across any violent conflicts, but take record of the cases in the Kalungu-Lwera sand mining conflicts.³⁰⁶ Most conflicts recorded were relatively minor, although without adequate management can have significant negative social and environmental impacts in Development Minerals communities and the surrounding areas. Some miners reported that there were no conflicts of any sort, although these answers may have been influenced by a fear to discuss sensitive issues with the research team.

Trends that emerged in the types of conflicts observed in the Development Minerals sector are categorised below:

Miners – Miners

- Intra-site conflict often took place in the form of petty theft between miners, particularly at night. The more vulnerable (young, working alone or not yet established) were at the highest risk of being subject to this kind of theft. Whilst informal organizational structures, such as the 'site leader' were sometimes asked to intervene, victims often did not take any action because of fear of repercussions from perpetrators.
- Certain types of conflicts were more prevalent in certain commodities. For example, conflicts over resources and specific boundaries were common at the salt sites, where separate pans operated in very close proximity and shared vital resources such as irrigation trenches.
- Gender-specific conflicts were not reported by any respondents, although entrenched gender inequality over a sustained length of time is likely to create discord and therefore pose conflict risks in the communities.
- General social discord around mining communities has also been recorded as a potential source of conflict. However, this seems more applicable to ASM production of gold and tin, tantalum and tungsten and large-scale mining projects rather than most ASM Development Minerals sites. In such cases, in-migration, young, male heavy communities with disposable income can lead to increased levels of alcoholism, prostitution, HIV/AIDS, increased gender disparities and family breakdown.³⁰⁷ Widening economic disparities, especially the availability of cash, can also put strain on established community dynamics.. These concerns may apply in some scenarios (e.g. sand mining areas, particularly where dominated by young, disenfranchised and vulnerable men), but risks generally seem to be less pronounced in ASM Development Minerals.
- Growing mining communities can also impact on intra-community levels of conflicts, such as an increase of petty theft of food and livestock to meet growing demands for food.³⁰⁸

³⁰⁶ Parliament of the Republic of Uganda (2016). Report of the Committee on Natural Resources on Sand Mining in Uganda.

³⁰⁷ Saferworld (2017). Mining in Uganda: A conflict-sensitive analysis. Accessed 8th October 2017. <https://www.saferworld.org.uk/downloads/pubdocs/mining-in-uganda.pdf>

³⁰⁸ Ibid.

Miners - Authorities

- Some conflicts were reported between miners and local authorities, particularly in cases where miners were working without proper permits. Respondents reported being chased away from sites by the authorities. This type of intervention was not reported to have deterred miners from returning to the site when they deemed it safe.
- In Tororo, conflicts arose between miners and the local authorities over the issue of mine waste pollution, which caused adverse environmental impacts in the surrounding area. This is likely to also cause conflict with local, non-mining communities that are affected by changes to their environment, particularly pollution and contamination of shared resources such as water and soil.

Miners - Buyers

- A commonly reported conflict was between miners and buyers, where buyers load up trucks that they do not end up paying for. The informal nature of the sector means miners are particularly vulnerable to exploitation of this kind, given that formal grievance mechanisms do not exist. However, some miners receive support from the authorities when theft is reported, even reaching settlements as a result of round tables between the buyers and the miners, held by local authorities.

Miners - Landowners

- Some conflicts were reported between miners and landowners, where volatile rent prices which may rise according to how much each miner produces caused discontent among tenants.

Miners (ASM) – Investors

- Although conflict of this kind was not observed by the research team during this study, conflict between larger-scale formal mines and ASM miners are commonplace in the Ugandan Development Minerals sector. Conflicts between medium-scale sand miners and artisanal miners operating within and outside of legal frameworks in Lwera, Masaka were reported in detail last year,³⁰⁹ as well as accounts of similar conflicts with ASM marble miners in Karamoja.³¹⁰ High levels of informality and lack of awareness of their own rights and legal frameworks mean that ASM miners are generally prone to high levels of exploitation in these conflict situations.

As presented above, the negative social impacts of mining-related conflicts can be considerable, and have the potential to reduce the sector's 'licence to operate' - thus justifying anti-ASM mentalities in governments and communities. They can also cause serious socio-economic harms, particularly for communities dependent on affected ecosystem services, and those made ill by air and water pollution.

³⁰⁹ Parliament of the Republic of Uganda (2016).

³¹⁰ Ibid.

Child Labour and Child Rights

The presence and participation of children in the ASM sector is an important aspect of the international discourse on child labour, specifically, on the Worst Forms of Child Labour (WFCL), as presented in the 1999 ILO Convention No. 182, ratified by Uganda in 2001. The Convention promotes the elimination of the participation of children in any work which “by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children”. These types of work are expected to be determined by national laws or regulations.

In Uganda, the minimum working age is 14 years. However, it is illegal for any child (under the age of 18) to be employed in “harmful or hazardous employment”, of which the definitions relevant to the Development Minerals sector include “work underground, work at dangerous heights or in confined spaces, work with dangerous ... equipment or tools, manual handling or transportation of heavy loads, ...or working for longer hours”. Despite this, the Uganda National Household Survey Report from 2009/10 stated that 2.75 million children aged 5-17 in Uganda were engaged in economic activities, 51% of whom (1.4 million) were engaged in hazardous work.

- Category 1:** Children (perceived to be) under the age of 14 who were present at the mine site, but were accompanying a family member and were not working
- Category 2:** Children (perceived to be) under the age of 14 who were performing certain jobs at the mine site, but whose work would not be deemed as harmful or hazardous
- Category 3:** Children (perceived to be) under the age of 14 who were performing the same jobs as the adults at the mine site, which could be deemed as hazardous work
- Category 4:** Children (perceived to be) between the ages of 14-17 who were performing certain jobs at the mine site, but whose work would not be deemed as harmful or hazardous
- Category 5:** Children (perceived to be) between the ages of 14-17 who were performing the same jobs as the adults at the mine site, which could be deemed as hazardous work

In the Development Minerals ASM sector, addressing the issue of the WFCL requires an in depth understanding of the context of each commodity and the variety of contexts in which children are present at the mine site. As discussed in the section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition”, the collection of statistical data for ages and status of children at the assessed sites was out of scope for this project. However, observations from fieldwork allowed for the emergence of 5 main categories in levels of participation of children on the mine site, which are repeated below:

In terms of distribution, the vast majority of children observed at Development Minerals sites would fall into category 1. Although the children in this category are not working, there are still potential risks associated with their presence at



Figure 51: Some children observing data collection at a clay site. Photo credit: Levin Sources

the mine site, as outlined in the section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition”. The widespread presence of heavy tools puts young children at risk of accidental injury. In stone quarries, clay or kaolin sites the high levels of dust in the air increase the risk of silicosis or kaolinosis. Moreover, their presence at the mine site during weekdays (when the majority of field data collection took place) precludes their presence at school, posing a risk to their education.

According to both national and international regulations, categories 3 and 5 would be classed as WFCL, should the specific task being performed by the child be classified as harmful or hazardous. Out of these two groups, those in category 5 (aged 14-17) were observed more commonly than those in category 3. This tendency is reflected in Uganda’s National Action Plan on the Elimination of the Worst Forms of Child Labour (2012), which states that those above the minimum working age but below 18 years of age are most vulnerable to being exposed to the WFCL, largely due to the lack of alternative employment options brought about by high rates of youth unemployment in the country, and low rates of secondary school enrolment.³¹¹

However, it is important to acknowledge the nuances and complexity which can lead to youths being involved in WFCL, especially given that it often represents efforts made by them to negotiate poverty and enhance their livelihood opportunities by diversifying away from more traditional activities such as subsistence agriculture or domestic work.³¹²

Macro- and Micro- Economic Development Impacts

The main economic impacts synthesize those compiled from previous sections. These are summarized as follows:

- **Employment and its Multiplier Effects.** ASM provides a crucial source of livelihoods for over 390,000 Ugandans, particularly for disenfranchised, low-skilled workers with limited alternatives. The majority of miners are also engaged and invest in other economic activities, thus if further supports economic diversification. Furthermore, the average ASM miner is estimated to create 0.4 jobs in the downstream sector, and considering an average household size of 4.7, ASM Development Minerals directly and indirectly benefits almost 2.6 million Ugandans or about 7% of the population.
- **Local Economic Development.** Miners incomes are estimated to annually contribute almost \$124 million USD spent into local economies, towards education, health care and other family needs and as investment in diversifying economic activities, for instance in agricultural and trade. This is a vital catalyst for local economic development.
- **GDP.** If ASM Development Minerals, which amount to an estimated \$350 million USD per annum, were integrated within official statistics, the GDP would increase by 1.4%.

³¹¹ Republic of Uganda (2012). National Action Plan On Elimination Of The Worst Forms Of Child Labour In Uganda 2012/13 - 2016/17. Accessed 11th October 2017. https://www.unicef.org/uganda/NAP_Uganda_June_2012.pdf

³¹² Maconachie, R and Hilson, G (2016). World Development Vol. 78, pp.136-147. Re-thinking the Child Labor “Problem” in Rural sub-Saharan Africa: The Case of Sierra Leone’s Half Shovels. (University of Bath, UK; University of Surrey, UK)

- **VAT.** Based on household consumption patterns, miners contribute \$9.9 million USD per annum to VAT (equating to almost 2% of VAT collected in 2016).³¹³

Current Mitigation and Management Measures

Many of the socio-economic impacts of the ASM Development Minerals sector are positive, and need to be acknowledged. The macro- and micro-economic impacts of the sector are significant, inclusive of those related to employment and multiplier effects. However, positive impacts do not require mitigation or management, and so this section focuses on those impacts that can be perceived as social and economic risks to ASM Development Minerals stakeholders.

Conflict risks in the ASM Development Minerals sector, in particular at mine sites, are managed in a variety of ways, using both formal and informal structures. In general, grievance mechanisms entail tiers of elevation that relate to the gravity of the offence. Minor conflicts (e.g. pit boundary/irrigation trench conflicts between miners) are generally resolved bi-laterally amongst miners, whilst major conflicts (e.g. theft of several tonnes of product) are sometimes resolved in conjunction with formal authorities. Some miners have reported inadequate support to resolve such issues, which may be a factor of the informality of the sector.

Child labour risks – whilst there are no formal structures in place to mitigate against child labour at ASM Development Minerals sites, these risks are mitigated informally by the acceptance that young children should be protected from hard labour (one of the WFCL), meaning that children normally play supporting roles at the mine sites (e.g. hauling water, older children caregiving for infants). Whilst the presence of children on the mine sites is common, findings from the study also showed that some parents reported to using ASM Development Minerals proceeds to send their children to school, potentially mitigating against the presence of some children in a hazardous working environment.

Risks of unemployment or underemployment are minimised by the job creation and income generation aspect of the Development Minerals sector, the benefits of which should not be underestimated. Informal measures exist to protect against external shocks in the form of livelihood diversification, with many stakeholders using alternative livelihoods such as agriculture to supplement or stabilise their income and increase food security.

Community health risks are mitigated against in part by a few local government initiatives to improve sanitation and community infrastructure around mine sites, for example pit latrine banks and road improvements in Lake Katwe. In other places, Development Minerals income enables miners to provide better sanitation in the form of pit latrines for themselves, although this practice was not widespread.

Despite the significant socio-economic risks posed by Development Minerals ASM in Uganda, the sector plays an important role in income generation, which facilitates access to improved needs and services in areas such as education and health.

³¹³ Estimate based on estimated cumulative incomes of ASM Development Minerals miners (See section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: ASM Employment and Incomes”) and proportion spent on VAT-able goods derived from average consumption patterns of Ugandans in ADB (2012): A Comparison of Real Household Consumption Expenditures and Price Levels in Africa. African Development Bank (ADB). Tunis, Tunisia. Online at: <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Household%20Consumption%20Report.pdf>.

Gender Dimensions of Development Minerals Production

Gender Division of Labour

As discussed in the section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition”, women make up approximately 38% of the Development Minerals workforce, and have an especially strong presence in the salt and dimension stone sectors. In terms of its impact on Ugandan employment rates, the sector plays an important role in the employment of women in the country. In 2012/13, although 51% of the potential working force were women, only 45% of the employed force were women³¹⁴. In the Development Minerals sector, however, the high participation of women in the extraction and processing of certain commodities such as salt and stone reverses this imbalance.



Figure 52: Woman using a pickaxe at Kibalya kaolin site. Photo credit: Levin Sources

Having said this, the gender division of labour is a complex issue in ASM, and cannot be represented merely by % of workforce at a given time. A more accurate depiction of the gender division of labour is the gross distribution of benefits, as this takes into account the imbalance in remuneration between ‘women’s’ tasks and ‘men’s’ tasks, as presented in the section on “Profile of the Development Minerals Sector: Profile of the Development Minerals Private Sector: Workforce Composition”. Based on gender analysis conducted at ASM sites between 2012 and 2017 in Uganda

and neighbouring countries, one challenge when addressing this issue is the lack of reliable data that takes into account the distribution of benefits, as well as the many other factors that influence the differences in women’s and men’s participation rates³¹⁵. Gender-disaggregation of workforce statistics by job is critical then, not only in terms of increasing the visibility of women’s work in ASM, but for the purposes of characterizing the gender distribution of benefits from the sector.

Women’s domestic work burdens and daily schedules must be taken into account when considering women’s participation in the workforce. For instance, a woman who is married and has young children may spend fewer hours in ASM, particularly if her family owns land and she is also responsible for farming to meet household food security needs. Conversely, a single woman with no land may be more likely to mine full-time to subsist on a day-to-day basis (e.g. economic migrants from Northern Uganda working in Kampala stone quarries)³¹⁶. Although women who do not mine full time are often working full time on different activities, these “other” jobs, are in

³¹⁴ UBOS (2015a)

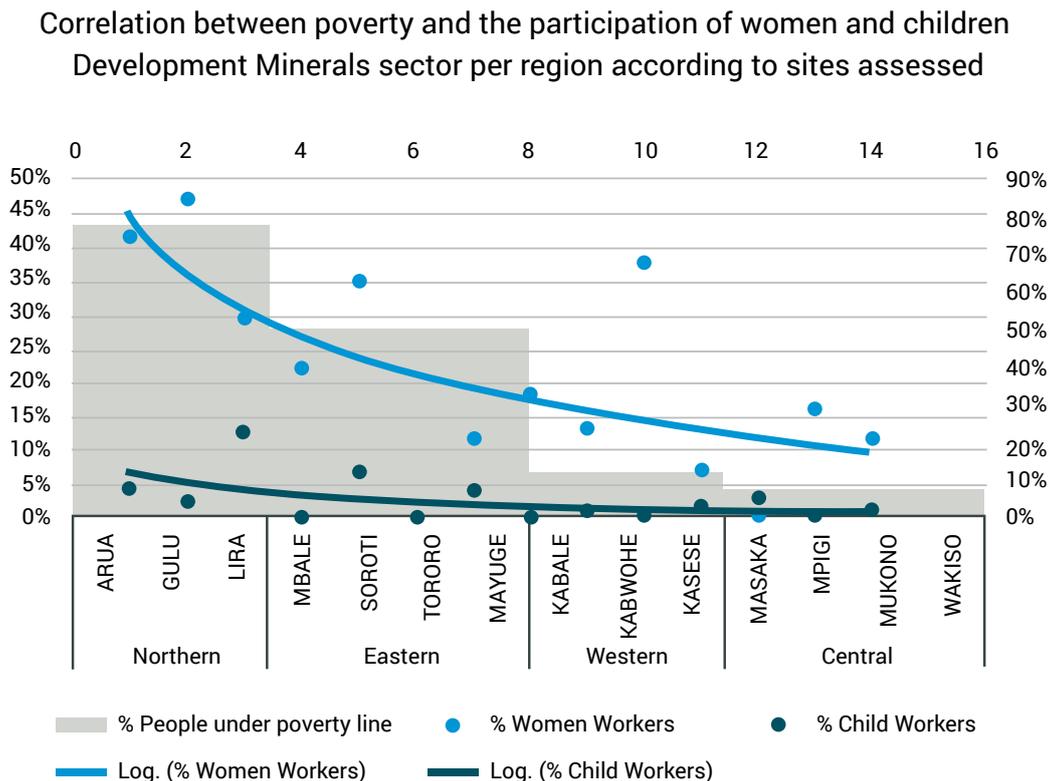
³¹⁵ A growing body of research suggests that women’s commercial work in mines is variable throughout the day, particularly where a woman is married (officially or common law), has young children and land is owned (farming responsibilities).

³¹⁶ Hinton, J. (2010). Recommendations for Class C Mining regulations and their Implementation and Future Amendments to the Mining and Minerals Act in Liberia, USAID Governance and Economic Assistance Program, USAID Report No. PN--ADT--546, 92p

many cases deemed to be peripheral to production, and are less valued. (e.g. hauling water and minerals, providing fuelwood, crushing limestone as a paid service, etc).

This often means that women end up earning significantly less than men. For example, due to the gender division of labour in selected clay and brick production sites in the central region, it was found that women constitute 15% of the workforce but yield only 8% of the revenues from ASM³¹⁷. At the Lake Katwe salt site, whilst nearly 70% of the workforce were women, only around 3% of salt pans were owned by women, a figure that hasn't changed since 2006³¹⁸. In Karamoja, whilst women can make up 80% of the workforce in some marble sites, key decision-making is carried out mostly by men³¹⁹. In stone quarries, women are much more likely to be restricted to lower paid jobs (e.g. crushing and sieving), showing a sector-wide 'glass ceiling' faced by women quarry workers. These restrictions came largely from perceptions that women were not physically able to perform certain types of jobs such as digging, a barrier which was only broken in a small number of sites.

Figure 53: Correlation between poverty indicators and participation of women and children.
Sources UBOS (2015), Field data



Poverty can also be an influencing factor in levels of women's participation in the Development Minerals sector. Women's participation was, in general, much higher in Northern Uganda than in the other regions. Uganda's northern region has significantly higher poverty and unemployment (formal employment) levels when compared to other regions, and this may play a part in the

³¹⁷ Derived from a 2017 DFID-supported study pending approval prior to dissemination.

³¹⁸ Hinton (2011)

³¹⁹ ECO (2015)

higher participation of women in ASM, as it becomes their only viable livelihood option. Data shows that the regions in which poverty levels are high are also the regions with the highest participation of women in Development Minerals ASM (see Figure 52)³²⁰. Whilst correlation does not imply causation, and the participation of women could be affected by a number of different cultural, educational and circumstantial aspects, it is worth taking note of this phenomenon for an in depth understanding of the regional differences of the sector in Uganda.

The correlation between poverty and the presence of children on the mine site is also presented in Figure 52, and is similar to the correlation between poverty and women's participation in the sector. Although there does seem to be a relationship between the presence of young children at ASM sites and women (typically an indication of lack of child care alternatives and attesting to the reliance of women on income from ASM), it is extremely important that women are considered as human beings and individuals in their own right. This tendency to aggregate "women and children" poses risks of de-individualizing women, with their function and value to society only in terms of their roles with respect to other human beings (e.g. wife of, mother to, sister of). Women working in ASM have a right to work, they rely on incomes from ASM in order to improve their lives and have their own aspirations, life goals and reasons for engaging in the sector as is the case for an individual man. This aggregation is best illustrated in both the prevailing and draft Minerals Policy.

It is likely that formalisation has a positive impact on the gender inequities of the Development Minerals sector. The clay sector workforce, for example, tends to be dominated by men. However, whilst most of the clay sites visited by the research teams were highly informal, one of the sites assessed, Butende Brickworks in Masaka, was fully formalised. At Butende, the gender imbalance was much less than in the informal sites, with women employed in almost the same capacity as men. Whilst there were still certain roles that were not generally performed by women, such as working in the kilns, the difference in employment levels and roles was less marked than in other, more informal, clay sites.

Similarly, kaolin, one of the more formalised examples of Development Minerals in Uganda, also presented a fairer and more accepting environment for women to work in, with women performing roles and using tools that were normally reserved only for men. (See Figure 51)

Gender Distribution of Impacts and Benefits

While women tend to yield fewer benefits in ASM, they may be more greatly impacted by the sectors' negative impacts.

Distribution of impacts according to gender may vary depending on individual abilities, needs and roles in and out of the mine. For example, women may be more affected when water resources are negatively impacted by Development Minerals ASM. Any shortage of and/or contaminated water affects mostly women since they are normally responsible for water collection and its domestic use. Inadequate water resources can mean long journeys to water points, delays and lack of

³²⁰ Table 3 is representative only of the sites visited by the research team in July 2017 (with the exception of Karamoja data), and as such is not a fully accurate picture of the whole of Uganda. However, sampling methods employed during the course of the fieldwork ensured, as far as possible, that any data collected could be extrapolated to present a realistic picture of the Development Minerals sector in the country as a whole. The anomalous data point for Kasese district is due to the traditionally high participation of women in the extraction of salt at and around Lake Katwe.



Figure 54: Women are often excluded from the higher paid jobs. Lira. Photo credit: ECO Uganda

portable water. Similarly deforestation can also have a disproportionate effect on women, as they normally collect wood for fuel, and it can make this task much more difficult and time consuming.

OHS impacts can also have a greater negative effect on women than on men. Although women are at less risk of fatality and injury from extractive activities, from which they are normally excluded, they are often adversely indirectly affected by ill health of family members. Whether that ill health comes as a result of working in Development Minerals or not, women are

often the primary carers for sick family members, meaning that they are not able to work as many days, and therefore generate as much income, as men.

Distribution of benefits also varies per site and per commodity, although women are normally disadvantaged in this respect. For example, at one clay site in Central Region where women make-up 20% of the workforce, it was reported that men are more likely to work on teams than women because they “render better service”, “men are more cooperative” and “women use money”, referring to the fact that women must pay to join a team whereas men join because of friendship. Higher paying jobs normally done in larger groups (e.g. 7-10 people) are normally performed by men, such as kiln construction and loading of trucks. Although these are not normally part of a male miner’s daily routine, these jobs can yield up to UGX 10,000 per person per day. Women are disadvantaged in not being able to access these sorts of activities.

Key Findings: Environmental, Occupational and Social Impacts

Among a number of environmental impacts, main concerns relate to land degradation, consumption of forest resources from clay brick and lime production and degradation of wetlands from sand and clay mining. ASM Development Minerals extracted in Uganda are estimated to directly impact approximately 515 km², or approximately 0.3% of the country’s total land area, far below that affected by agriculture (41%). Wetland degradation from clay and sand mining is extensive, covering ca. 221 km². Clay brick production alone is estimated at consume 2.9 million tonnes of wood per annum, impacting roughly 450 km² of forests annually. Although positive examples of management strategies exist in specific ASM sites (e.g. backfilling of abandoned pits, tree planting), these are few and far between.

Occupational health and safety risks are severe. Rocks falls and pit wall collapses are the main sources of serious injury and fatality with 34% of quarry sites assessed reporting at least one fatality, suggesting that fatalities could be as high as 1.1 deaths per 1,000 stone quarry workers per annum. Other serious risks are posed by dust exposure, heat stress and overexertion, flying rock fragments, alcohol abuse at some sites and poor sanitation and hygiene. This situation compounded by average workdays amounting to 9-10 hours per day and lack of on-site first aid, personal protective equipment (PPE) and other much-needed management measures.

Social impacts can be both positive and negative. The main issues include conflicts between miners, between miners and trader often related to non- or under-payment and between miners and other land users. Child labour and the presence of children at mines are a serious concern although many miners cite work in ASM as providing them with the means to send their kids to school. The inequitable distribution of revenues, crude methods and inadequate knowledge and technical capacity to improve performance have resulted in very low individual incomes of mineworkers, less than half of the GNI per capita. Gender inequalities are particularly pronounced, particularly with respect to the distribution of benefits (e.g. jobs, revenues) and impacts (e.g. affect of siltation on downstream water users). Other human rights issues concern potentially increased risks of exploitation and other abuses by some authorities against unlicensed miners. The latter may become a bigger issue as public awareness of ASM Development Minerals grows.

Socio-economic contributions are nevertheless significant. ASM provides a crucial source of livelihoods for over 390,000 Ugandans, particularly for disenfranchised, low-skilled workers with limited alternatives. The majority of miners are also engaged and invest in other economic activities, thus if further supports economic diversification. Main economic contributions include the following:

- **GDP.** If ASM Development Minerals, which amount to an estimated \$350 million USD per annum, were integrated within official statistics, the GDP would increase by 1.4%.
- **VAT.** Based on household consumption patterns, miners contribute \$9.9 million USD per annum to VAT (equating to almost 2% of VAT collected in 2016).
- **Local Economic Development.** Miners incomes are estimated to annually contribute almost \$124 million USD spent into local economies, towards education, health care and other family needs and as investment in diversifying economic activities, for instance in agricultural and trade. This is a vital catalyst for local economic development.
- **Multiplier Effects.** The average ASM miner is estimated to create 0.4 jobs in the downstream sector, and considering an average household size of 4.7, ASM Development Minerals directly and indirectly benefits almost 2.6 million Ugandans or about 7% of the population.

Conclusions & Recommendations

Detailed findings and recommendations are presented at the end of each chapter and they have also been collated in the executive summary. This final section therefore focuses on the most important cross-cutting conclusions and recommendations that should guide policy and programme responses by GoU, the ACP-EU Development Minerals Programme and all other stakeholders involved in promoting ASM Development Minerals in Uganda.

Conclusions

This study has shown that the Development Minerals sector plays a significant role in Uganda. As the majority of Development Minerals are produced by ASM, the sector generates income for a large workforce, as well as contributing to both local and national economic development. The high participation of women in the workforce, particularly for some commodities such as stone aggregate and salt, highlights the importance of the sector in reducing gender imbalances in paid employment across the country and the significance of women's contributions to development.

However, the sector is not without its challenges. It poses significant environmental, social and occupational risks, which must be managed better if negative impacts are to be reduced over time. The sector is also severely under-documented, which presents barriers to better management and oversight by the institutions that govern it as well as to the development of more appropriately-tailored services by training providers, financial institutions and other relevant service providers. A better understanding of the sector and its workforce is crucial if it is to grow sustainably and in a way that generates long-term and sustainable social and economic benefits for the country.

Despite these challenges, there is significant potential for the sector to expand further. GoU has made infrastructure one of its top priorities. This, combined with the growth in residential and commercial construction driven by Uganda's burgeoning population, offers significant scope for the Development Minerals sector to generate sustained income and employment opportunities, especially for the thousands of young people entering the Ugandan workforce each year. Furthermore, there is strong potential for the sector to reduce Uganda's trade deficit by producing materials locally that are currently being imported to meet growing domestic demand.

Finally, the ongoing policy and legal reform process provides a major opportunity for filling key gaps in the existing policy and regulatory framework and delivering the substantial opportunities that the sector holds. Indeed, the outcomes of these processes shall ultimately determine whether Development Minerals achieve their full potential as an engine for inclusive and gender-responsive development, wealth creation and Uganda's aim to become an upper middle-income country by 2032.

Recommendations

The following recommendations cut across each of the Baseline Assessment components and will require strong and sustained GoU commitment to reforms that enable the ASM Development Minerals sector to maximise its full potential. The ACP-EU Development Minerals Programme is ideally placed to work closely with all relevant parties in GoU, in particular the MEMD as its main development partner as well as civil society and the private sector to accompany and support the sector and the country on this important journey.

The ongoing policy, legal and institutional reform process has a critical role to play in transforming the sector to realise its full potential for economic and social development in Uganda.

- The establishment of a dedicated ASM unit or department in DGSM is a critical need. The designation of specific officers and offices and revisions to job descriptions to include ASM-related responsibilities provide an interim response to the need for better GoU oversight of ASM. However, this alone should not be regarded as a viable long-term solution. Given the size and economic importance of ASM (including Development Minerals) and the prominent role the mining sector is expected to play in delivering Uganda's Vision 2040, it is essential that the necessary structures and resources are put in place within DGSM and local government, in particular, to ensure that Uganda's ASM sector receives the guidance and support it needs. This includes essential opportunities and challenges related to women's and youth empowerment and child labour, which are fundamental to maximizing the sector's potential.
- Development Minerals stakeholders from the private sector (including ASM), central and local government and civil society should be better supported and encouraged to play a role in the current policy and legal reform process. ASM and women mineworkers in particular will need targeted assistance in order to sufficiently understand the opportunities and risks associated with the proposed reforms and contribute to the debate in a meaningful way. The gap analysis presented in this baseline can provide a useful basis to inform all interested parties and help build the capacity of those who need such support.
- The reform process should provide a basis to develop critical mechanisms and strategies. These should include a formal coordination mechanism within central government (e.g. DGSM, MOLG, MGLSD, NEMA, National Bureau of Standards, etc) and between central and local government actors (e.g. formal communication mechanisms, clarification of mandates, roles and responsibilities). Such a National ASM Development Minerals forum should work to strike the right balance between taxation and policing of the sector on the one hand and providing relevant and demand-led extension services on the other.
- Collaborative design and piloting different devolved governance arrangements for the ASM Development Minerals sector. This could be done initially in 1-2 districts in close coordination with DGSM and inputs from key actors in MGLSD, NEMA, URA and other relevant agencies. Critical issues to consider during such a pilot will include information sharing with respect to licencing and permitting activities, revenue collection and how revenues are used by GoU, and strengthening the capacity of officers representing key line ministries in order to support regulation and provide support services. Extension services to be prioritized during such a pilot should include setting up gender-responsive organizations, guidance on environmental reclamation techniques and safety mitigation measures, and market development opportunities for miners and their representative bodies.

- Minerals sector promotion is one of twenty main objectives within the draft National Mining and Minerals Policy of Uganda. Related strategies could include a forum to facilitate greater engagement by ASM Development Minerals sector stakeholders and other key actors engaged in networking, trade fairs, business training organizations and other MSME promotion and support activities could help with the creation of a more coherent and effective approach to sector promotion.

Emphasize human capacity development and empowerment of gender-responsive ASM organizations as the foundation for transforming the sector. Current training models and approaches by the ACP-EU Development Minerals Programme provide an excellent model for similar programs implemented by government and other actors (e.g. civil society organizations, donors, etc) and should be promoted more widely. These efforts could be strengthened by:

- Continuing to ensure partnership with and engagement of relevant government officials in design and delivery of training in order to (a) build their capacity to implement future training programs without external assistance and (b) strengthen links with and understanding of the realities facing miners on the ground. This should include key central government personnel (e.g. DGSM Mining Engineers) and local government officers (e.g. CDOs).
- Classroom-based training should be replaced as much as possible with learning from practical demonstration and application of skills at site level. Ideally, officials who are mandated to support ASM Development Minerals should be technically supported to deliver field-based hands-on coaching to address a range of technical, organizational, occupational and environmental issues. Experienced “senior” small scale miners or retrenched or retired personnel from medium- or large-scale operations can transfer knowledge more effectively and economically than consultants and could make excellent technical counterparts to government officers in extension service delivery. Additional time and resources should be allocated to provide targeted training of women mineworkers.
- Providing some scholarships for short-term training (with a focus on greater value addition, e.g. hands-on dimension stone cutting training in Mwanza) would be a practical addition to training already being provided by the Programme and DGSM.
- All training curricula and materials should be as relevant and specific to the reality of the sector and its stakeholders as is possible. For instance, business training should assess and build upon the current models of organization, financing and operations used in specific ASM sites and commodities. Training in environmental and occupational and safety and health risks should target the specific challenges identified in this baseline report as well as in consultation with miners. Additional guidance can be drawn from Uganda’s Small Scale Mining Handbook.
- Organizational formation and strengthening should include training in institution building and how to make organizations properly responsive to gender and human-rights concerns. Such programs should have a strong focus on building leadership and advocacy skills, in particular for women mineworkers. If, over time, new structures such as a national federation emerge then these might warrant additional support, provided they genuinely represent the interest of the most important ASM stakeholders.

Establishment of a range of pilot project such as “model mines” and “model value chains” could provide a platform for inclusive, practical experimentation and sustained progress. This would also reduce the risk of limited resources being spread too thinly. Well planned and executed pilot activities have the potential to generate the concrete evidence needed to demonstrate the sector’s full potential, enrich awareness raising efforts and provide much-needed lessons for mid- to long-term capacity building and policy reform purposes. Such an approach could also establish demonstration sites for hands-on training. Options to consider include:

- Piloting procurement models in 1-2 districts for using ASM suppliers for civil works projects. Engagement of DGSM, local government and the National Bureau of Standards laboratories and direct support to selected mines would be needed to ensure the ASM suppliers can meet criteria for quality and quantity. Technical support might include measures to increase production, improve understanding of standards, introduce mechanisms for certification of materials, training in business skills, occupational safety and health, environmental management and reclamation techniques, and women’s economic empowerment. This should also include pilot activities to tackle child labour with a strong emphasis on women’s economic empowerment and be underpinned by multi-stakeholder (mineworkers, teachers, parents, authorities) commitments to action. A local mining committee, such as the one in Karamoja Region, could be established to support these pilot projects and potentially provide a model for expansion to other ASM areas.
- Piloting a Vocational Training Certificate in ASM Development Minerals which will require the development and testing of a curriculum tailored to the sector’s specific characteristics. Affirmative action commitments (including an allocation of at least 30% of slots to women students) should be included.
- Piloting collaborations between large- and small-scale operators. This would require scoping to determine whether there is sufficient willingness to work together and where the capacity to coordinate such an initiative might exist. Entry points for collaboration may be found within companies’ CSR strategies. This could include, for example, the sharing of technological innovations (such as the use of coffee husks in clay brick production), purchase agreements, or allowing smaller operators to benefit from technical expertise and/or equipment of larger firms (e.g. cement manufacturers providing sample analysis for ASM lime producers).
- Co-develop and pilot alternative financing models. This could include tapping into initiatives to offer loans via mobile money, campaigns to extend SACCOs to ASM Development Minerals sites, and the establishment of dedicated “mining desks” within locally situated and interested banks. An initial dialogue or forum with potentially interested commercial banks, the UIA SME Unit, microfinance institutions and key CSOs and NGOs delivering financial services to the poorest Ugandans could represent an important starting point.

- Piloting intermediate, appropriate technologies, ideally in conjunction with financing efforts. Uganda's Small Scale Mining Handbook provides specific technical guidance and direction on this topic while more recent research on clay bricks, in particular, detail optimized approaches to brick production. This could involve closer collaboration between units within DGSM and also with relevant academic institutions (e.g. Makerere or Busitema University) to co-develop, build and field test new approaches to SME development. It could also help raise awareness among universities of the importance of the ASM Development Minerals sector to Uganda and how they might be able to promote the sector through their research and teaching.
- The ACP-EU Development Minerals Programme and GoU could consider supporting the launch of a National Development Minerals Conference and/or "sharefair", potentially at UMA's Lugogo Showground. This would provide a forum for showcasing best practice and achievements from the ACP-EU Development Minerals Programme, highlighting the importance of ASM and the Development Minerals in particular for Uganda, and strengthening networks and linkages between key stakeholders as a foundation for sustained advancement of the sector.

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Annexes

Annex 1: Geology, Geochemistry and Mineralogy of Selected Mineral Occurrences

Figure 55: Map of Development Mineral Occurrences and Mines on Geology in Uganda

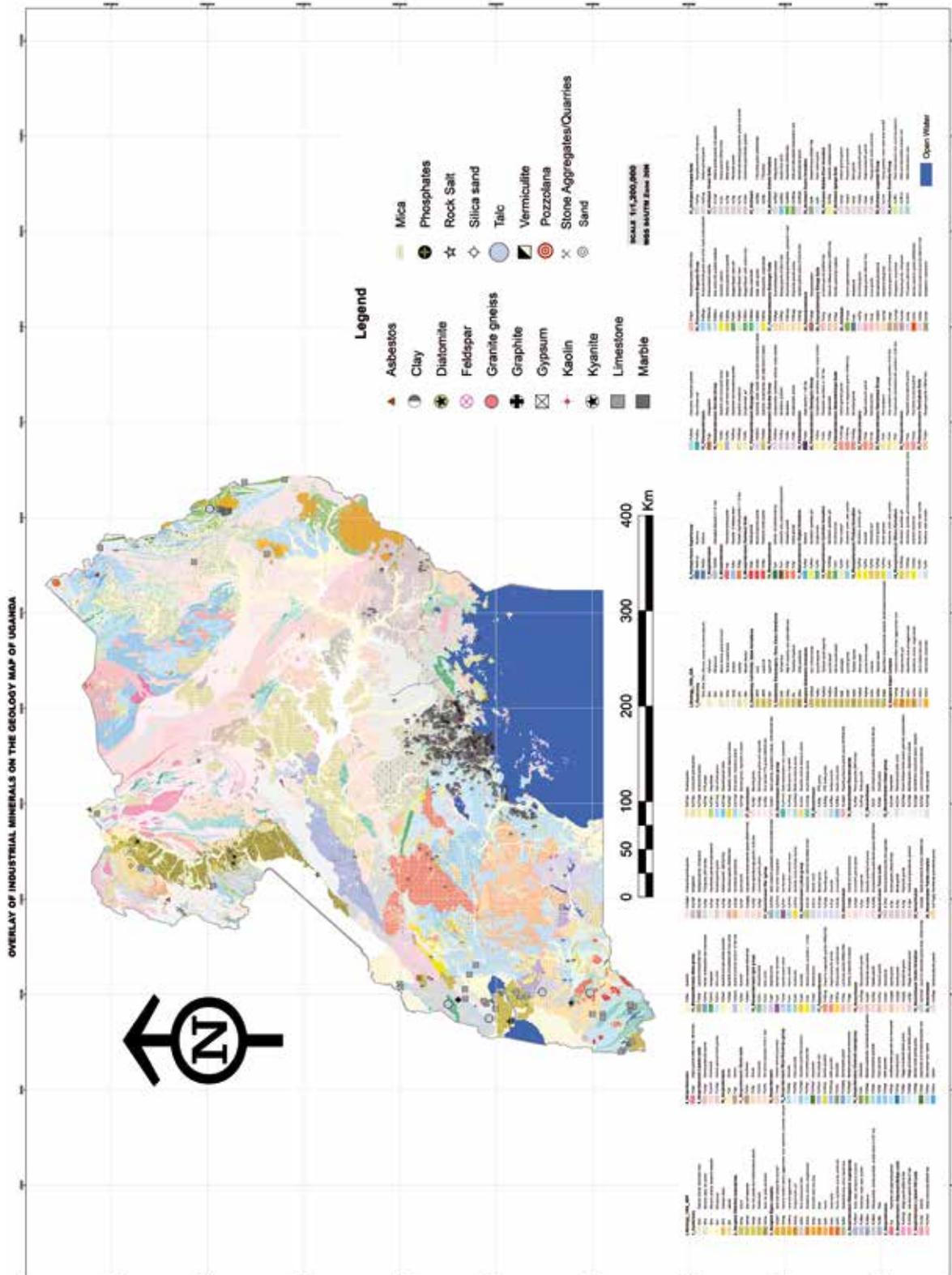


Figure 56: Map of Development Mineral Occurrences and Mines on Geology in the Kampala Region

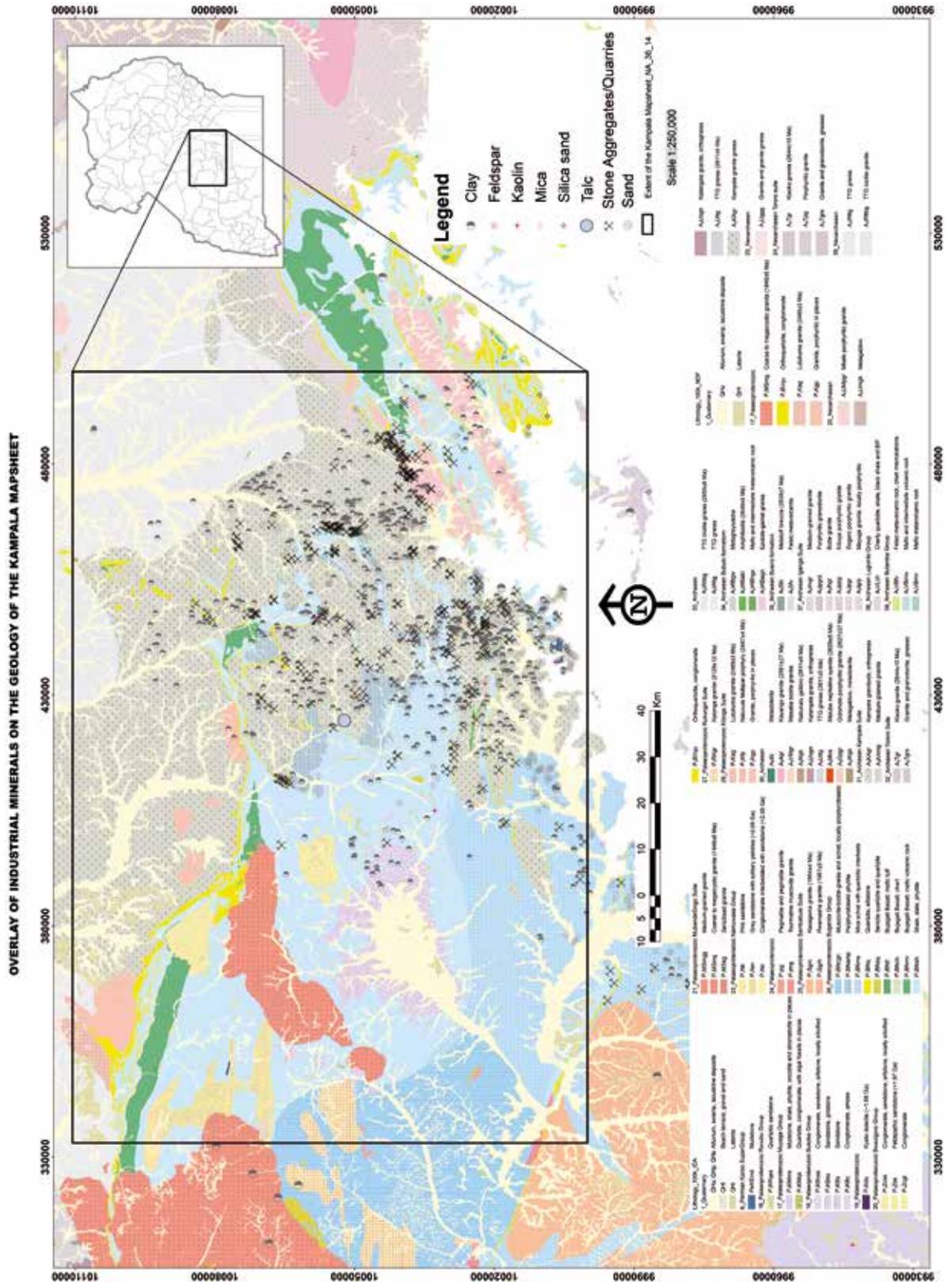


Table 16: Geologic, Geochemical & Mineralogical Characteristics of Selected Occurrences and Deposits

Commodity	Main Occurrences and Deposits	General Geology	Geochemical and/or Mineralogical Characteristics	Resource potential
Clay (common)	*Kajjansi	Sedimentary origin. Derived from extensive weathering, erosion and alteration of Precambrian gneissic and granitoid rocks	Clay(22-41%), Silt(23-54%), Sand(8-55%) Chemical composition: SiO2(51.59-76.08%), TiO2(1.02-1.67%), Al2O3(12.29-23.96%), Fe2O3(3.11-12.20%) XRD composition: Kaolinite(24.4-53.4%), chlorite(0.2-2.5%), Quartz(22.6-60.8%) Nyakairu et al (2002)	Not known
	kitiko		Clay(14-42%), Silt(19-55%), Sand(13-61%) Nyakairu et al (2002) Chemical composition: SiO2(53.43-74.98%)TiO2(0.58-1.39%), Al2O3(11.92-27.08%), Fe2O3(2.25-6.84%) XRD composition: Kaolinite(24.0-61.4%), chlorite(0.2-0.6%), Quartz(22.2-60.1%) Nyakairu et al (2002)	
	Masooli		Clay(13-26%), silt(20-38%), Sand(41-57%) Chemical composition: SiO2(64-80.53%), TiO2(0.81-0.91%), Al2O3(9.49-19.28%), Fe2O3(2.4-4.54%) XRD composition: Kaolinite(13.4-37.9%), chlorite(0.4%), Quartz(39.7-68.4%) Nyakairu et al (2002)	
	Ntawo		Clay(5-34%), Silt(29-56%), Sand(24-65%) Chemical composition: SiO2(51.59-76.08%), TiO2(1.02-1.67%), Al2O3(12.29-23.96%), Fe2O3(3.11-12.20%) XRD composition: Kaolinite(11.9-33.3%), chlorite(0.2-0.5%), Quartz(44.6-73.8%) Nyakairu et al (2002)	
	Buwambo, Namakonkomi hill, Wakiso district	Pegmatite. Hosted in Buganda-Toro rocks. Mostly strongly weathered (kaolinized).	Kaolinite(best up to 60%, on average <20%), mica minerals (illite-muscovite) is well over 50%, Quartz9on average 15-20%). Hydroyclone sediments: 90-95% kaolinite with some quartz and mica, Grain distribution <10 microns, ISO brightness 88-90, Viscosity 300-304 cP, brightness 90.46–90.50% and yellowness 3.57–3.62%.(GTK, 2011)	
Clay: Kaolin	Mutaka, Bushenyi district (174343E/9918189N)	Pegmatite. Not weathered throughout and there are parts where most of feldspar still Remains.	Kaolinite(13.5%), K-feldspar(85.5%). kaolinite is very pure: Al2O3 38.43%, SiO2 47.69%, K2O 1.02% and Fe2O3 0.34%. Grain distribution 25-35% in 20 microns fraction:K-feldspar concentrate chemical composition: K2O-content (14–17%) and Fe2O3 (0.02–0.1%). (GTK, 2011)	Proved reserves 300,557 tons and probable reserves 538,623 tons
	Moni, Mbale district (633833E, 117949N)	The rock is coarse grained pegmatite granite which is partly kaolinized.	The main minerals of Moni weathered material are: quartz, Kfeldspar, kaolinite and illite-muscovite, occasionally also plagioclase. Kaolinite(20%-50%). Chemical composition: Al2O3 (13.8 -28.5%), SiO2 (56.8 -78.7%) and K2O (2.83-6.35%). Iron content (0.35–0.45%). (GTK, 2011)	

Commodity	Main Occurrences and Deposits	General Geology	Geochemical and/or Mineralogical Characteristics	Resource potential
Clay: Kaolin	Kibalya, Bushenyi district (203025E/9951425N)	The Kibalya kaolin is derived from Kibaran (Karagwe-Ankolean) siltstones/schists by regional weathering and the resulted material is very fine grained.	XRD determination: kaolinite (65%), quartz (30%) and illite-muscovite (5%). XRF analysis: Al2O3(18.9 -19.1%), SiO2(70–71%), K2O(3.60–3.64%) and Fe2O3(2.07-2.10%). Drying shrinkage (0.7%), water absorption (25–27%) and plasticity index 37%. (GTK, 2011)	The kaolinized area at Kibalya extends more than 1 km in length and the depth may exceed 50 m.
	Kabale district	The bedrock belongs to Karagwe-Ankolean (Kibaran) siltstones/schists	XRD determination: kaolinite content (50 and 55%), quartz (35 and 40%), illite-muscovite 10%. XRF analysis: (19.0 and 22.0%), Al2O3, (66.0 and 72.6%), SiO2 (3.60 and 5.31%) K2O 0.71% and 1.67% Fe2O3. (GTK, 2011)	kaolin occurs quite extensively and exposures can be observed in several road cuttings along the main road both towards Kisoro and Ntungamo.
	Koki, Rakai District (319195E/9934635N)	The host rocks are Kibaran sandstones/schists	XRD: kaolinite 92 and 60%, quartz (40 and 45%), illite-muscovite (5 and 25%), and some plagioclase. XRF analysis: Al2O3(15.8%), SiO2(75.7%), K2O(2.53%) and 1.15% Fe2O3. drying shrinkage (0.7%), water absorption (30–33%) and plasticity index (30–33%). (GTK, 2011)	1 million tonnes
Clay: Bentonite	Burama, Rukungiri District (817906E/9978092N)	Windblown sediment source	Smectite (85%), kaolinite (10%), quartz (below 5%) and K-feldspar (< 5%). Clay mainly Ca-bentonite, but there Na in the lattice. 0.19% Na2O and 0.76% CaO, SiO2 56.7%, Al2O3 24.3% and Fe2O3 4.42% (GTK, 2011)	Across 1.7 ha area, bentonite in 3–4 m thick layer, totalling 115,000 t. (Kato, 2008).
	Ntungwa, Rukungiri District (810791E/9931597N)	Windblown sediment source; in valley walls dissected by River Ntungwa.	Smectite (80%), K- and Ca-feldspar (both < 10%), with minor kaolinite, quartz and analcime. Chemical composition by three XRF analyses is: Na2O 0.74–1.21%, CaO 0.96–1.27% and main components: SiO2 58.7–60.3%, Al2O3 14.3–16.9% and Fe2O3 7.64–8.81%. (GTK, 2011)	Thickness unknown; overlain by ca. 10 m thick Quarternary sand and gravel overburden
	Kaiso Village, Lake Albert, Hoima District	Discrete layers in Quaternary Sediments	Tbd	Tbd
Dimension Stone	Lwemivubo, Mubende district	Found within Mubende granite massive. Well developed vertical and horizontal jointing. Strongly fractured owing to explosive use. (GTK, 2011)		
	Kiganda, Mubende district	Found within Singo granite.	The rock is coarse grained, porphyric, post-orogenic granite. The colour varies from reddish to greyish, plagioclase is often a bit greenish. (GTK, 2011)	

Commodity	Main Occurrences and Deposits	General Geology	Geochemical and/or Mineralogical Characteristics	Resource potential
Dimension Stone	Mwezi, mubende district (393583E/71670N, alt. 1263 m).	Found within North eastern end of Singo granite	Medium to fine grained. (GTK, 2011)	
Gypsum	Kibuku, Bundibugyo disstrict	Occurs as float and in clay beds with rift valley sediments	Gypsum crystals are clear and pure only with minor inclusions as impurities. Mineralogical composition: quartz, gypsum, clay minerals, kaolinite, plagioclase and K-feldspar. EDS-SEM analyses: O(57.35-68.84%), S (14.60-20.49%), Ca(15.93-23.17%) (GTK, 2011)	There is an estimated 2Mt ³²¹
Limestone	*Hima Limestone deposit, kasese district	lacustrine limestone(sedimentary in origin)	Principally dark-grey in colour.	Extensive and covers about 2.5km ² . 5m thick clay layer separates distinct lower and upper limestone bed about 5m. 18- 20 million tons of reserves, 6 million of which is suitable for Portland cement manufacture. (Nagudi 2011)
	Muhokya limestone deposit	Tufa deposit	Moderate purity limestone with high magnesia and phosphorous trace content.	Total reserves estimated at 0.25 million tons (Nagudi 2011)
	Dura limestone deposit, Kamwenge district	Thick bands of almost pure aragonite occur in calcareous sinters in a narrow valley.	Creamy white, hard and compact rocks with convoluted laminations or banding	Barnes in 1954 estimated 1-2 million tons of good quality travertine that remain (Nagudi 2011)
	Kaku river beach, kisoro district	boulders of travertine	Chemical analysis: low magnesium content, 51.77 % CaO and 2.03 % MgO (Kato 2010).	Total resources are not known
	*Tororo carbonatite	Igneous in origin		Reserves are estimated to be over 25 million tons. (Nagudi 2011)
Sand (Silica sand, glass sand)	Diimu, Rakai district	Alluvial. Occurs in and on the margins of wetlands throughout the country as well as on lake shores	99.93% SiO ₂ , 0.05% Fe ₂ O ₃	More than 2 million tonnes (Katto,1997)

Commodity	Main Occurrences and Deposits	General Geology	Geochemical and/or Mineralogical Characteristics	Resource potential
Sand (Silica sand, glass sand)	Nalumuli bay, Mukono district		-	Estimated at 200,000 tonnes(Katto,1997)
	Nyimu bay, Mukono district		-	Estimated at 50,000 tonnes(Katto,1997)
	Kome island, Buvuma		99.95% SiO2	Not known
	Bukakata, Masaka district		99.93% SiO2, 0.05% Fe2O3	Not known
Salt	Lake katwe, Kasese district	Within Quaternary tuff material	Na2CO3(78%), NaCl(8%), Na2SO4(9%), K2SO4(3%), KCl(2%), KBr(0.1%)	22.3 million tonnes(Katto 1997)
Stone Aggregate	Lwemivubo aggregate quarry	Found within Mubende granite massive. Well developed vertical and horizontal jointing.	-	Not known
	Kiganda aggregate quarry	Found within Singo granite.	The rock is coarse grained, porphyric, post-orogenic granite. The colour varies from reddish to greyish, plagioclase is often a bit greenish. (GTK, 2011)	Not known
	Mwezi aggregate quarry	Found within North eastern end of Singo granite	Medium to fine grained. (GTK, 2011)	Not known
	Ntungamo aggregate quarry (192852 E, 9903107 N)	Granitic, slightly foliated and porphyric	The form of aggregate particles is near cubic. (GTK, 2011)	Not known
Vermiculite	Namekara, Toroto-Mbale road	Occurs on the southwestern margin of the Bukusu complex, where the vermiculite formation has been developed at the contact between mica-rich pyroxenite and carbonatite. The vermiculite is formed as weathering product of phlogopite. The deposit is overlain by a 5-6 m soil cover, composing largely of magnetic residue.	The vermiculite content in the ore is 26.7% in fraction +180 microns and 18.8% in the +425 micron fraction.	Estimated to contain an inferred resource of about 54.9 Mt. (GTK, 2011)

Sources: Hinton, J.; Kabongo, I.; Kabiswa, C. et al. (2011). The mining and minerals sector in Karamoja region: development opportunities and constraints. Kampala (UG). ISBN: 9789970405008. Online at: <http://ecouganda.org/attachments/article/112/THE%20MINING%20AND%20MINERALS%20SECTOR.pdf>.

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Annex 2: Main Development Minerals Production Sites and Areas

Table 17: Main Development Minerals Production Sites and Areas in Uganda (* indicates production by medium to large scale producers; all other sites are ASM)³²²³²³³²⁴

Commodity	Central Region	Western Region	Eastern Region	Northern Region
Clay (common)	Mpigi (Buyala ³²² , Nkozi clays limited) Wakiso (Kisembi ³²² , Kikandwa-Kakiri ³³⁵ , Uganda clays Limited, Lweza clays limited Africana clays Ltd) Masaka ³²² (Butende, Kyalusowe) Mukono (Nakiyanja brick makers) Kampala (Kyanja) Greater Kampala (wetlands feeding into Lake Victoria) Mukono ³²³ (Goma S/C; Nakisunga S/C) Wakiso ³²² (Kajjansi, Katabi, Kiggungui) Entebbe-Mpigi Corridor, Kampala-Mukono Corridor, Kampala-Wakiso Town Corridor, Kampala-Masaka corridor, etc.	Mbarara (Buhiyi) Kyegegwa (Migongwa) Hoima (Butema) ³²⁴ Hoima (Kaiso-Tonya-Kaolin) ³³⁰ Multiple wetland production sites. Concentrated in Kisoro-Kabale; north of Ntungamo Town, Multiple dispersed non-wetland sites (murrum).	Budaka (*Uganda clays Ltd) ³²² Mbale ³²² (Busano s/c-Bumamali pottery group) Tororo (Malawa) Sironko (Mutufu, Budadiri in areas of past volcanicity of eastern Uganda near Mt. Elgon) ³²⁶ Some wetland production sites; extensive, Multiple dispersed non-wetland sites (murrum)	Arua (Asevu-Vurra S/C) ³²² Some wetland production sites; extensive, Multiple dispersed non-wetland sites (murrum)

³²² Visited during field research

³²³ MEMD (2014b). Mining Investment in Uganda. Accessed November 1st, 2017. <https://www.slideshare.net/miningontop/uganda-minister-presentation-mining-on-top-africalondon-summituk2426-june-2014>

Commodity	Central Region	Western Region	Eastern Region	Northern Region
Clay: Kaolin	Wakiso district(Buwambo, Migade hill) ³²⁴ In pockets ("white clay") with certain deposits above.	Buhweju (Mutaka) Sporadic mountainside pockets (Kabale, Kisoro), Sheema district (Kibalya) ³²⁷ In pockets ("white clay") with certain deposits above.	Mbale district(Moni) In pockets ("white clay") with certain deposits above.	In pockets ("white clay") with certain deposits above.
Clay: Bentonite	-	Rukungiri (Burama, Ntungwa)	-	-
Dimension Stone	Mubende district ³²⁷ by *Building majesties limited. Luwero district ³²⁷ by *Flux Enterprises. Mukono District ³²⁷ By *Hong run industry Uganda co. Ltd Mubende district(Lwemivubo stone quarry, Kiganda stone quarry, Mwezi stone quarry) ³²⁸ ASM production sites throughout.	Hoima district By *Mugume George, Tropical sky mineral Rock Ltd Kiryandongo district ³²⁷ by *Pioneer General Buildings Ltd. ASM production sites throughout.	Bukedea district ³²⁷ by *ionic builders Ltd. Tororo district ³²⁷ by *Big picture corporation. ASM production sites throughout.	Gulu District (Laroo ³²⁶) Moroto (Katikikele) ³²⁶ Karamoja (Rupa, Kosiroi, Tank Hill, Forest Reserve, Matheniko, Pule and Lolung) ³²⁹ Lira district ³²⁷ by *Minimax Enterprises Ltd ASM production sites throughout.
Gypsum	-	Bundibugyo (Kibuku)		

³²⁴ ACEMP (2017).

³²⁵ MEMD (2014b)

³²⁶ I. Z., Mukasa-Tebandeke, P. J. M. Ssebuwufu, S. A. Nyanzi, A. Schumann, G. W. A. Nyakairu, M. Ntale, and F. Lugolobi (2015) "The Elemental, Mineralogical, IR, DTA and XRD Analyses Characterized Clays and Clay Minerals of Central and Eastern Uganda." *Advances in Materials Physics and Chemistry* 05, no. 02

³²⁷ Visited during field research

³²⁸ Hinton, J.(2012), Guidelines for Mainstreaming Gender in the Minerals Sector, Publications of the International Conference on the Great Lakes Region (ICGLR) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 94p.

³²⁹ Uganda Chamber of Mines and Petroleum. Uganda's Mineral Localities and Progress. Accessed November 1st, 2017. <http://www.ucmp.ug/files/minerals/1495454637Localities-of-Minerals-of-Uganda.pdf>

Commodity	Central Region	Western Region	Eastern Region	Northern Region
Limestone	-	Kasese (Muhokya S/C) ³³⁰ Kisoro (Kaku, Kinanira) ³³⁰ Kamwenge(Dura) ³³¹ by LSM *Hima cement Ltd	Tororo (Osukulu and Rubongi S/C) ³³⁰ and Bududa ³³¹ district by LSM *Tororo Cement Ltd.	<i>Limestone:</i> Moyo (Metu) ³³⁰ <i>Limestone and/or Marble:</i> Moroto (Katikikele, Koseroi, Rupa, Lokupoi, Moruangeber, Karikacham) ³³⁰ Kotido (Toror Hill, Naunyet, Ngolapulon and Nakagelmoru, Nakadapalait) ³³² Napak (Napak Hill) ³³¹ Nakapirpirit (Morumeri) ³³¹
Marble	-	-		
Pozzolanic Ash	-	Kabarole District (Bwanika, Nyantabooma in Kichwamaba S/C) ³³³ Rubirizi district ³³¹ by *Industrial minerals Ltd	Kapchorwa ³³¹ (currenty by LSM, *Tororo Cement Ltd, *Kampala Cement company Ltd, *National cement company Uganda Ltd, *Eastern mining Limited)	
Sand	Wakiso(Kayirira, Gobero-Mubiyanja) ³³⁴ Masaka(Kiyumba) ³³⁴ Mukono(Bwanga Katosi sand mine) ³³⁴ Masaka (south of Masaka Town) ³³⁰ Mukono (Goma S/C; Nakisunga S/C) ³³⁴ . Mpigi (Katabi) ³³⁵ Glass Quality Sand (but used for construction): Buikwe (Katosi in Njeru); Masaka (Bukakata, Lwera); Mukono (Nyoka-Nalumuli Bay) ³³⁶ Buvuma (Kome Island) ³³⁷	Ntungamo (Kabajenda) ³³⁴ In and adjacent to rivers and wetlands throughout the region.	Mayuge(Nango Beach) ³³⁴ In and adjacent to rivers and wetlands throughout the region.	Arua(Orumule-Azaa sand group) ³³⁴ In and adjacent to rivers and wetlands throughout the region. Less common in Karamoja Region.

³³⁰ MEMD (2009a)³³¹ Uganda Mining Cadastre Portal. Accessed October 11th, 2017. <http://portals.flexicadastre.com/uganda>³³² ACEMP (2017)³³³ Yager, T.R., (2016)³³⁴ MEMD (2014b)³³⁵ MEMD (2009)³³⁶ Uganda Mining Cadastre Portal³³⁷ I. Z., Mukasa-Tebandeke et al. (2015)

Commodity	Central Region	Western Region	Eastern Region	Northern Region
Salt	-	Kasese (Lake Katwe ³³⁸ , Katwe Kabatooro Town Council; Kasenyi) Hoima (Kibiro Salt Works)		
Stone Aggregate	Wakiso (Jinja Kaloli stone quarry Gobero-Namayumba ³³⁵ , Kissi ³³⁵ , Kazinga stone quarry, Krima stone quarry) Mukono (Nsuube stone quarry ³³⁵ , Katikoro stone quarry) Masaka(Kigatto ³³⁵ , Lwanda) Kampala(Kitezi stone quarry) Greater Kampala and neighbouring districts (Wakiso, Mukono, Masaka, Luwero) Kampala-Mukono Corridor (multiple, Kireka, Mbalala); Entebbe-Kajjansi Corridor; Kampala-Luwero corridor. Mukono-Lugaizi corridor Mpigi-Entebbe Corridor	Kabale(Kiyora) ³³⁵ ASM production sites throughout. Industrial quarries associated with roadworks.	Soroti (Ochuloi) ^{340, 335} Dokolo (Dokolo) ³³⁶ Tororo (Pete) ³⁴¹ Industrial quarries associated with roadworks. Sironko(Blue stone quarry) ASM production sites throughout.	Gulu (Laroo ³³⁷ , Kagere ³³⁶); Lira (Okii Village ³⁴² , Barobogo Village ³⁴³ , Ngetta S/C ³³⁵) Arua(Zengule, Onyabia) ³³⁵ Sporadic ASM production sites throughout. Industrial quarries associated with roadworks.

³³⁸ Visited during field research

³³⁹ Visited during field research

³⁴⁰ MEMD (2009)

³⁴¹ Uganda Mining Cadastre Portal

³⁴² R. Odongo, (2013), Two Buried Alive in Quarry, <https://ugandaradionetwork.com/story/two-buried-alive-in-quarry>

³⁴³ Apunyo (2015). Schoolgirl Killed at Stone Quarry. <http://archives.visiongroup.co.ug/regional-news/15832-schoolgirl-killed-at-quarry>.

Annex 3: Type and Accessibility of Geodata

Table 18: Type and Accessibility of Geodata for Selected Providers

Geodata Provider	Nature and Quality of Available Data	Requirements for Access	Location of Geodata
Directorate of Geological Survey and Mines: Cartography, GeoInformation Center (library)	Geologic and mineral occurrence maps and reports, mineralogical studies, geophysical data and maps, technical and economic assessments of different deposits.	DGSM Geoinformation Center (library) open to the public. Some materials can be copied for the price of photocopying.	DGSM Entebbe.
		Online database (reports, documents) searchable by locality, commodity and other identifiers (not in service)	www.uganda-mining.go.ug
		Maps can be purchased in hard or soft copy for varying costs.	DGSM Entebbe
		Geophysics can be purchased in electronic copy at a price of between 30-300 UGX per line km. While the whole data set can be bought at 26,264,700 UGX Must sign confidentiality agreement.	DGSM Entebbe
Directorate of Geological Survey and Mines: Mining Cadastre	Licensing data (location, size, license holder)	Free, open access online. Can be accessed with assistance at the DGSM Geoinformation Center in Entebbe.	DGSM Entebbe or http://portals.flexicadastre.com/uganda/
National Environment Management Authority	Topographic maps, National State of Environment Reports, District State of Environment Reports.	Free, open access online for some data, e.g., More general reports are available as free downloads	http://www.nema.go.ug/
Ministry of Water and Environment	Hydrogeology and hydrology (rivers, lakes, groundwater).	Free, open access online for some data, e.g., More general reports/ documents are available as free downloads	http://www.mwe.go.ug/
Min. of Lands, Housing and Urban Development	Topographic maps, political maps, Road maps	Free, open access online for some data, e.g., More general reports/ documents are available as free downloads	http://mlhud.go.ug/documents/
National Forestry Authority	Topographic maps, land cover and vegetation cover data	Free, open access online for some data, e.g., More general reports/ documents are available as free downloads	http://www.nfa.org.ug/
Uganda National Meteorological Authority	Climate data and maps	Free, open access online for some data, e.g., More general reports/ documents are available as free downloads	https://www.unma.go.ug/index.php
Makerere University	Geology and analytical data reports		Makerere University Departmental libraries and laboratories

Annex 4: Table of Networking Events

Networking Events	Where	By Who	When	Aim
The Kampala Private Equity(PE) And Venture Capital(VC) Conference,2015 ³⁴⁴	Kampala Serena Hotel	PE and VC firms and SMEs	24 th -25 th June 2015	Introducing alternative financing options for SMEs.
Investor consultative and facilitation conference 2017 ³⁴⁵	Hotel African	Mrs. Jolly-UIA Executive Director, Mr. Morrison Rwakakamba, David Sseppuya	21 st June 2017	Investment promotion
Investment opportunities and networking conference 2016 ³⁴⁶	Hotel African	Former Finance Minister,Hon.Maria Kiwanuka	23 rd June 2016	To network and identify key investment opportunities in Uganda
Teso Investment Forum 2016 ³⁴⁷		UIA, Participants from districts of Teso Region.	28 th April 2016	-To identify investment opportunities in districts of Teso Region. -To also engage local governments and the private sector in the districts so that they are actively engaged in Investment promotion, facilitation and aftercare services in their areas.
The 2 nd Kampala Private Equity and Venture Capital Conference 2016. ³⁴⁸	Serena Hotel	Business people, Entrepreneurs and Private Equity firms	21 st June 2016	<i>To enhance the growth of SMEs through alternative financing.</i>

³⁴⁴ <https://www.ugandainvest.go.ug/wp-content/uploads/2016/04/PEVC-2015-Conference-Report.pdf>

³⁴⁵ <https://www.ugandainvest.go.ug/consultative-conference-2017/>

³⁴⁶ <https://www.ugandainvest.go.ug/investment-opportunities-networking-conference/>

³⁴⁷ <https://www.ugandainvest.go.ug/teso-investment-forum-2016/>

³⁴⁸ <https://www.ugandainvest.go.ug/2nd-kampala-pevc/>

Networking Events	Where	By Who	When	Aim
The 3 rd United Arab Emirates Trade Mission Conference ³⁴⁹	Sheraton Hotel	Hon. Matia Kasaija, Minister of Finance, Planning and Economic Development. UIA and UAE delegates.	28 th -29 th November 2016	To improve trade between Uganda and United Arab Emirates
4 th Mineral Wealth Conference held in Kampala. ³⁵⁰	Sheraton Hotel	UCMP	1 st -2 nd October 2015	Processing minerals for value addition.
5 th Mineral Wealth Conference ³⁵¹	Serena Hotel	Democratic Governance Facility and UCMP	5 th -6 th October 2016 (Annual)	To create a platform for redressing gender imbalances and networking opportunities.
Mineral sector retreat ³⁵²	State House Entebbe	UCMP	December 2013	Building the Uganda mineral sector.
Uganda National Consultation Workshop on Development Minerals.	Kampala	UNDP	30 th -31 st August 2016	

³⁴⁹ <https://www.ugandainvest.go.ug/3rd-uae-trade-mission/>

³⁵⁰ <https://www.dgf.ug/news/fourth-mineral-wealth-conference-held-kampala>

³⁵¹ <http://www.ucmp.ug/archive.php>

³⁵² <http://www.ucmp.ug/archive.php>

Annex 5: Table of Guides to Investment in Uganda

Guide book	What it's about	Who is it for
An Investment Guide to Uganda Opportunities and Conditions (March 2001) ³⁵³	<ul style="list-style-type: none"> • Describes the general conditions in which investors must operate such as the micro economic conditions and infrastructure. • Describes areas of potential interest to foreign investors including agriculture, agro-processing and related industries, mining, building, construction and housing etc. • Focuses on regulations governing investment and foreign direct investment. • Summarises feedback received from the private sector (both foreign and domestic) in workshop held in 2000. 	Foreign Direct Investors who are largely unfamiliar with the country covered.
Small and Medium Enterprises (SME) Business Guide. March 2008 ³⁵⁴	<ul style="list-style-type: none"> • Highlights the business development services that are available to SMEs right from inception to implementation of the business as follows; • Describes the procedure for establishing an SME in Uganda. • Explains how to access business finance. • Explains how to access business development services for SMEs as well as other business support services. 	All SMEs including both local and foreign investors.
The Compendium of Diaspora. Investment and Business Opportunities. Vol.1 ³⁵⁵	<ul style="list-style-type: none"> • Provides a brief overview of business climate in Uganda with profiles of 17 sectors and a summary of market conditions. • Provides details on the investment and tax regime in Uganda as well as potential investment and business opportunities. 	Potential Diaspora investors.
Brief Guide to Investing in Uganda June 2015 ³⁵⁶	<ul style="list-style-type: none"> • Describes the strategic benefits of Uganda's location as a base for regional trade and investment. • Explains business registration and licensing procedures and available investment opportunities. 	Investors
Karamoja Investment Profile 2016 ³⁵⁷	<ul style="list-style-type: none"> • Highlights the mineral sector as one of the lucrative investment in Karamoja sub regions. 	

³⁵³ <http://unctad.org/en/docs/poiteiitm30.en.pdf>

³⁵⁴ http://www.iceida.is/media/pdf/SME_GUIDE_FINAL_COPY.pdf

³⁵⁵ <https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/Compendium-of-Investment-and-Business-Opportunities-Vol-I.pdf>

³⁵⁶ <https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/Guide-to-investing-in-Uganda.pdf>

³⁵⁷ <https://www.ugandainvest.go.ug/wp-content/uploads/2016/04/uia-Karamoja-profile.pdf>

Annex 6: Table of Training Centres

Training centre	Training area	Location by District	Address
Nakawa Vocational Training Institute.	Brick/block work Construction work Concrete technology Architectural work.	Kampala	Nakawa Vocational Training Institute, Plot 96 P.O.Box 20121 Kampala, Uganda Email: nakawavocational@yahoo.com
Kampala Polytechnic Mengo	Building, construction and the built environment.	Kampala	Plot 129 Kabakanjagala road, 50 m off Rubaga road round-about towards Kabaka palace P.O.Boxx14349 Kampala
Nile Vocational Institute NVI	Building, construction and the built environment.	Mukono	Nile Vocational Training Institute Plot No 89-101 Buikwe Road P.O.Box 1829 JINJA
St.Joseph's Technical Institute.	Building and concrete practice.	Wakiso	St.Joseph's Technical Institute P.O.Box 20 Kisubi,Entebbe.
Bbira Vocational Training School.	Bricklaying and concrete practice.	Wakiso	P.O.Box 6551 Kampala
COWA Vocational Training Centre	Building and construction	Wakiso	Plot 567 Kiwumulo Road P.O.Box 8868 Kampala-Uganda Email:-cowavtc@africaonline.co.ug
Don Bosco Vocational Training Centre, Bombo	Bricklaying, mixing of mortars, types of bricks, types of quality sand and wallbuilding.	Luwero	P.O.Box 10117 Bombo Kampala-Uganda
Olio Community Polytechnic	Bricklaying and concrete	Soroti	Olio Community Polytechnic P.O.Box 239 Soroti
Foundation for Development of Needy Communities	Building, construction and the built environment	Mbale	Foundation for Development of Needy Communities, Natondome, Bungokho, Mbale Uganda P.O.Box 2431
Lumino Community Polytechnic	Building, construction and built environment	Busia	P.O Box 240 Busia
Bungokho Rural Development Centre.	Building and concrete practice	Mbale	P.O.Box Mbale, Located on Mbale Tororo road 3miles from Mbale town opposite the army Barracks.
Lake Bunyonyi Christian Community Vocational Secondary School.	Bricklaying and concrete practice	Kabale	Lake Bunyonyi Christian Vocational Secondary School, P.O.Bo 172, Kabale
Ave Maria Voc. Training & Youth Development Centre	Building and construction	Lira	AVE MARIA VOCATIONAL TRAINING & YOUTH DEVELOPMENT CENTRE P.O.BOX 172, LIRA, UGANDA EAST AFRICA
St. Joseph's MAYO VTI	Building and construction	Rakai	ST.JOSEPH'S MAYO P.O.Box 37,KALISIZO,Uganda Website www.mayouganda.org

Annex 7: Table of Financing Options

Financing Options		Description
The East African Development Bank ³⁵⁸		Long term loan, medium term loan, short/working capital, trade finance, equity investment, agency for loan funds etc
DFCU term finance ³⁵⁹		Medium and long term finance options to sectors like manufacturing, mining, quarrying, transport and communications, and health centres
Commercial External Borrowing ³⁶⁰		Euro bond.
Concessional External Borrowing ³⁶¹		Loans with grant element >=35% from traditional multilateral and bilateral lenders eg IDA,AfDB.
Semi concessional external borrowing ³⁶²		Loans with grant element <35% from other bilateral lenders like china. Less-concessional loans from traditional lenders e.g. EIB,AfDB
GoU savings (Bank Of Uganda Financing) ³⁶³		Micro finance support center limited. msc@utlonline.co.ug
Debt finance ³⁶⁴	Banks/financial institutions.eg. Bank Of Africa Limited, Barclays Bank, Centenary Bank, DFCU Bank, Orient Bank, Post Bank, Stanbic Bank Uganda Limited, and Standard Chartered Bank, Uganda Development Bank.	This includes loans, overdrafts, trade financing, leasing and special assets acquisition products.
	Guarantee schemes	Offered by insurance as well as banks to ease access to credit facilities.
	Regional trade finance.	Provided by regional banks offering mainly medium to long term financing, PTA and ADB.
	International trade finance.	Offered as refunds to programs that involved cross border trade between designated nations, notably CDE, pro-invest under the EU, national EXIM banks.
Equity finance ³⁶⁵	Venture capital	Offered by international development partners like IFC,CDC,ADB ,through accredited commercial banks .This include special funds for women entrepreneurs, sector specific support
	Public listing	Mainly for large corporate companies; the option is yet to be applied to SMEs

³⁵⁸ https://www.ebiz.go.ug/wp-content/uploads/2015/12/IR_ISSUE_1_Vol_2.pdf

³⁵⁹ https://www.ebiz.go.ug/wp-content/uploads/2015/12/IR_ISSUE_1_Vol_2.pdf

³⁶⁰ <http://npa.ug/wp-content/uploads/1st-NDPF-Financing-Options-2nd-paper.pdf>

³⁶¹ <http://npa.ug/wp-content/uploads/1st-NDPF-Financing-Options-2nd-paper.pdf>

³⁶² <http://npa.ug/wp-content/uploads/1st-NDPF-Financing-Options-2nd-paper.pdf>

³⁶³ <http://npa.ug/wp-content/uploads/1st-NDPF-Financing-Options-2nd-paper.pdf>

³⁶⁴ http://www.iceida.is/media/pdf/SME_GUIDE_FINAL_COPY.pdf

³⁶⁵ http://www.iceida.is/media/pdf/SME_GUIDE_FINAL_COPY.pdf

Annex 8: Table of Organisations and Associations

Organizations and associations	Description.
Uganda small-scale industries association.	<p>The Uganda Small-scale Industries Association is a registered voluntary non-governmental business organization open to all registered small-scale industries in Uganda.</p> <ul style="list-style-type: none"> • Services offered include: capacity building through providing business and technical training and product design and development. • The association also helps with identifying market opportunities through trade fairs, exhibitions and exposure tours. • Facilitates linkages with other organizations focused on small-scale industry and creation of roundtable discussion between members. • Provides skills upgrading and skills training programs implemented for members.
Uganda Manufactures Association ³⁶⁶	<p>The Ugandan Manufacturers Association is one of the largest organizations representing the broad industrial and commercial sectors of Uganda's economy and an important forum for private sector in the country.</p> <p>Services include:</p> <ul style="list-style-type: none"> • Quality management including ISO certification schemes, ISO 9001-2000, ISO 14001 on environment management system, ISO 17925 for laboratory management standard, Hazard Analysis and Critical Control Points(HACCP). • Training services including in-house courses designed for specific company needs and open courses for general business management and development nature. • Consultancy covering operational issues such as productivity, marketing, sales and technology improvement to strategic planning sessions. • Business promotion through trade fairs.
Federation of Ugandan employers ³⁶⁷	<p>The Federation of Ugandan Employers represents employers on social and economic issues</p> <p>Services include:</p> <ul style="list-style-type: none"> • Training in employment relations management. • Policy and advocacy for favorable policies relevant to employers. • Information dissemination.
Business Uganda development scheme (BUDS), Private Sector Foundation Uganda (PSFU) ³⁶⁸	<p>BUDS and PSFU offer financial support in form of cost-share grants to micro, small and medium enterprises, enabling them to obtain and use market, technical or financial expertise with the aim of making them more productive and competitive.</p>
Enterprise Uganda ³⁶⁹	<p>Enterprise Uganda is an institution designed to support the government in realizing its objective in promoting the SMEs to become the main vehicle for expanding production, providing sustainable jobs and enhancing economic growth.</p> <p>Services include:</p> <ul style="list-style-type: none"> • Business health checks. • Entrepreneurship training workshops. • Business opportunity identification through idea generation, idea screening and testing, business profiling and idea selection. • Business counselling and advisory services for companies that have gone through the business health check exercise. • Assistance preparing business plans.

³⁶⁶ www.uma.or.ug³⁶⁷ www.employers.co.ug³⁶⁸ www.psfuganda.org³⁶⁹ www.enterprise.co.ug

Organizations and associations	Description.
Uganda Investment Authority-SME Desk. ³⁷⁰	<p>The Uganda Investment Authority-SME desk is a semi-autonomous government agency operating in partnership with private sector and government to drive national economic growth and development. It offers services for both national and foreign enterprises. Services include:</p> <ul style="list-style-type: none"> • Entrepreneurship training. • Business health checks. • Business registration for foreign SMEs and issuing of investment licenses. • Business opportunity identification.
Fit Uganda Limited ³⁷¹	<p>FIT is Uganda's leading private sector business development consulting company that has grown to provide capacity building and facilitation support to the small and medium enterprises in Uganda through service providers. Services include.</p> <ul style="list-style-type: none"> • Training and providing business counselling, tailored capacity building, and organization of information exchange forums. • Advice on good governance, SME policy research, strategic planning and business environment screening.
Bergen Consult (U) Limited. ³⁷²	<p>Bergen Consult is a local consulting company which specialises in building capacity for both public and private entities. The company encourages and trains SMEs to adopt best practices while running their businesses. Services include:</p> <ul style="list-style-type: none"> • Training and capacity building in areas of financial management. • Feasibility studies, business plans, baseline studies, management studies and planning, project planning and management. • Cost benefit analysis and impact studies. • Monitoring and evaluation and designing of exit strategy/expansion models for businesses/projects. • Business health checks and advisory services.
Savimaxx Limited. ³⁷³	<p>Savimaxx is an environmental management consulting company which offers advice on how to carry out business in an environmentally friendly and profitable way. The company encourages SMEs to protect the environment and sustainable use of natural resources for this generation and other generation s of income. Services include:</p> <ul style="list-style-type: none"> • Environmental impact assessments, environmental audits, natural resources management, environmental engineering advisory services, industrial development, tourism development and community development. • Feasibility studies and business plans, forest management plans, baseline studies, management studies and planning, project planning and management.
Voluntary Action For Development (VAD). ³⁷⁴	<p>VAD is an NGO formed to empower the poor rural communities to participate in social and economic development through training and resource mobilization. Services include:</p> <ul style="list-style-type: none"> • Training in basic business management skills. • Credit facilities to communities.

³⁷⁰ www.ugandainvest.com

³⁷¹ www.Fituganda.com

³⁷² www.bergenconsult.com

³⁷³ 0712654651@sms.ugandatelcom.com

³⁷⁴ vad@vad-ug.org

Organizations and associations	Description.
Uganda Network of Businesses ³⁷⁵	<p>This is a MSME membership business organization which aims at facilitating job creation and sustainable economic growth and development with an ultimate goal of poverty reduction. Services include:</p> <ul style="list-style-type: none"> • Training and capacity building for MSMEs. • Information sharing and networking for members. • Promotion of introduction of new technologies in the value chain, new products and new methods of carrying out business among MSMEs. • Linking members to help them access credit from Pimbas Savings, Cooperative and Credit Society(SACCO)

Annex 9: Lists of equipment and prices at Central Materials Lab

Table 19: Range and Status of Functioning of Testing Equipment at the Central Materials Laboratory, Kampala

Testing Equipment	Function	Working Condition
Shearbox machine	Testing bearing capacity	✓
Cone penetrometer	Testing liquid limit during classification	✓
Permeability cells	Testing permeability of soils	✓
Hydrometer	Monitors density of suspension with time	✓
Vicat apparatus	Determining the normal consistency and time setting of cement	✓
Viscometer	Testing viscosity	✓
Furnace	To provide continuous heating to process samples and materials	✓
Water steel	For distilled water	✓
centrifuge	Extracts bitumen from asphalt concrete	✓
Flash and fire heater	Used to find out the type and quantities for the availability of undesirable materials in the asphalt, and to determine the safe point of heating the asphalt during the construction process (to protect asphalt from burning).	✓
Water bath/soak tank	For curing concrete	✓
Digital compression testing machine	Determining compressive strength of concrete	✓
Balance	To determine the weight/mass of samples and materials	✓
Los angeles abrasion machine	Tests aggregates for resistance to abrasion	✓
Concrete moulds	Making concrete cubes (150mm x 150mm)	✓

³⁷⁵ ugnb2006@yahoo.com

Testing Equipment	Function	Working Condition
Automated compactor	Automatically compacts and rotates mold after each blow while keeping track of the number of hammer blows and shutting off once a preset number of blows is reached	✓
Marshall stability tester	To determine the stability of the bituminous mix materials and capability of resistance against plastic deformation and flow value of the materials	✓
Tensiometer	Testing tensile strength of steel bars	X
Stone polishing value machine	To polish stones	✓
Flexural testing machine	To determine flexural strength and flexural modulus	✓
Ductility machine	To determine ductility of formed asphalt/cement	✓

UNBS lab prices for some common tests on Development Minerals and products

Product	Parameter	Cost (UGX)
Aggregates (Coarse and Fine)	Materials Lab Parameters	
(ASTM C136, ASTM C127/ AASHTO T85 and ASTM C128/AASHTO T84)	Water absorption	10,000/=
	Loss Angeles Abrasion Value	20,000/=
	Ten Per Cent Fines Value (TFV)	23,000/=
	Ten Percent Fines Values (FFT) Wet/Dry Strength Ratio	25,000/=
	Flakiness index	25,000/=
	Specific Gravity	32,000/=
	Sodium Sulfate Soundness	35,000/=
	Aggregate Crushing Value	40,000/=
	Aggregate impact value	40,000/=
	Polished stone value (PSV)	50,000/=
	sub total	300,000/=
	lab fee	10,000/=
	Total	310,000/=

Product	Parameter	Cost (UGX)
Concrete cubes		
(BS 5911: Part 1: 2002)	Dimensions	5,000/=
	Straightness	5,000/=
	Surface cracking	5,000/=
	Squareness of ends	5,000/=
	Surface voids	5,000/=
	Cover to reinforcement	5,000/=
	Water absorption	10,000/=
	Crushing strength	50,000/
	Aggregates	60,000/=
	Maximum load	150,000/=
	sub total	300,000/=
	lab fee	10,000/=
	Total	310,000/=
Pre-cast concrete paving blocks		
(US 65:2002 Specification for pre-cast concrete paving blocks)	Dimensional tests	5,000/=
	Compression strength	20,000/=
	sub total	25,000/=
	lab fee	10,000/=
	Total	35,000/=
Prestressed Concrete Slabs - Waffles		
(IS 456 : 2000, Plain and Reinforced Concrete)	Dimensional Test (mm)	10,000/=
	Permeability	35,000/=
	Flexural strength	50,000/=
	sub total	95,000/=
	lab fee	10,000/=
	Total	105,000/=

Product	Parameter	Cost (UGX)
Tiles (ceramic, floor, granite)		
(US ISO 13006: 2012)	Group	2,000/=
	Dimensional tests (mm)	3,000/=
	Marking	5,000/=
	Water absorption	10,000/=
	Permeability	10,000/=
	Breaking Strength	10,000/=
	Modulus of rupture	60,000/=
	sub total	100,000/=
	lab fee	10,000/=
	Total	110,000/=
Clay roofing tiles and ridges		
(US 154:1995, Specification for Concrete Roofing Tiles)	Type and Dimensional test	5,000/=
	Water absorption	10,000/=
	Permeability test	10,000/=
	Breaking load	30,000/=
	sub total	55,000/=
	lab fee	10,000/=
	Total	65,000/=
Burnt clay bricks		
(US 102 : 1995, Burnt clay bricks - Specification)	Dimensions	5,000/=
	Efflorescence	5,000/=
	Physical Shape, Appearance and Finishing	5,000/=
	Weight	5,000/=
	Compressive strength	10,000/=
	Water absorption	10,000/=
	sub total	40,000/=
	lab fee	10,000/=
	Total	50,000/=

Product	Parameter	Cost (UGX)
Sand		
(BS 882:1992)	Grading	10,000/=
	Silicate content	50,000/=
	Organic content	50,000/=
	Chloride content	50,000/=
	Sulphate content	50,000/=
	sub total	210,000/=
	lab fee	10,000/=
	Total	220,000/=
Sand for concrete		
(BS 882: 1992)	Chloride content (NaCl)	100,000/=
	sub total	100,000/=
	lab fee	10,000/=
	Total	110,000/=
	Lime for soil stabilisation	
	Soundness	5,000/=
	Fineness	5,000/=
	Available lime (as CaO)	26,000/=
	sub total	36,000/=
	lab fee	10,000/=
	Total	46,000/=
Lime		
(ASTM Volume 04.01)	Available (free) lime	50,000/=
	sub total	50,000/=
	lab fee	10,000/=
	Total	60,000/=
Building lime		
(US 156:1995)	Soundness	5,000/=
	Fineness	5,000/=
	Loss on ignition	20,000/=
	Available lime (as CaO)	26,000/=
	sub total	56,000/=
	lab fee	10,000/=
	Total	66,000/=

Product	Parameter	Cost (UGX)
Cement		
(US 310 -1 : 2016)	Standard consistency	5,000/=
	Setting time	5,000/=
	Soundness	5,000/=
	Density	5,000/=
	Fineness	5,000/=
	Weight	5,000/=
	Marking	5,000/=
	Pozzolanicity	10,000/=
	Loss on ignition	10,000/=
	Heat of hydration	20,000/=
	Insoluble residue	21,000/=
	Sulphate content	28,000/=
	Compression Strength	40,000/=
	Alkalinity	50,000/=
	sub total	214,000/=
	lab fee	10,000/=
	Total	224,000/=
Adhesive cement		
(US ISO 13007-1)	Weight	5,000/=
	Marking	5,000/=
	Description	5,000/=
	Characteristics	5,000/=
	Class	5,000/=
	Type	10,000/=
	Application	10,000/=
	Slip resistance	24,000/=
	Transverse deformation	40,000/=
	Suitability	50,000/=
	sub total	159,000/=
	lab fee	10,000/=
	Total	169,000/=

Product	Parameter	Cost (UGX)
Fortified Food Grade Salt		
(US EAS 35:2012)	Chemistry Lab Parameters	
	Moisture content	20,000/=
	pH of 20 g in 100 ml distilled water solution	20,000/=
	Calcium (as Ca) water soluble on dry matter basis	25,000/=
	Magnesium (as Mg) water-soluble on dry matter basis	25,000/=
	Chloride content as NaCl on dry matter basis	25,000/=
	Water insoluble matter	30,000/=
	Acid insoluble matter	30,000/=
	Iodine	50,000/=
	Sulphate (as SO ₄), % on dry matter basis	50,000/=
	sub total	275,000/=
	lab fee	10,000/=
	Total	285,000/=
Kaolin powder	Chemistry Lab Parameters	
(US)	pH	20,000/=
	Lead	50,000/=
	Chromium	50,000/=
	Cadmium	50,000/=
	sub total	170,000/=
	lab fee	10,000/=
	Total	180,000/=

The following steps must be followed during the billing and issuing of Bank Payment Advice Forms (BPAFs) for Clients to pay for UNBS services through URA e-platform:-

1. Log into URA Website/Home Page at www.ura.go.ug
2. Click e-Services
3. Click Payment Registration from Payments category
4. Click to select Other NTR
5. Select UGANDA NATIONAL BUREAU OF STANDARDS under Ministry/Department/ Agency
6. Select STANDARDS DEPARTMENT under STANDARDS
7. Select SALE OF STANDARDS under CATEGORY
8. Select STANDARDS under TAX HEAD
9. Go to Fees Calculation and enter amount under Additional Fees if Applicable (in UGX)

10. Enter your TIN (tax identification number)
11. Fill the OTHER DETAILS under Taxpayer Details
12. Select MODE OF PAYMENT under Payment Mode
13. Select your Preferred Bank under URA's Banker Name
14. Enter text from the given image
15. Click Accept and Register to register your payment
16. Reconfirm by clicking OK
17. Print 2 copies of the Bank Payment Advice Form
18. Bring the bank payment slip to UNBS Accounts Office & obtain a receipt
19. Present the receipt to UNBS Information Resource Centre & obtain a copy of the standard(s) you paid for

Annex 10: Selected Research on Development Minerals in Uganda

Year	Title of Project/Publication	Commodity	Target Locality	Scope and Focus
Technical Research				
2017	William Kariiti Kayamba and Philip Kwesiga (2017): Breaking through traditions: The brick and tile industry in Ankole region, Uganda	Clay bricks	Ankole region	Manufacturing process, of bricks and tiles in the Ankole region of Western Uganda; improved technology and innovations, (firing, kiln technology, wood consumption etc.)
2016	Thomas Niwamara, Mark Olweny, Alex Ndibwami (2016): Embodied Energy of Low Income Rural Housing in Uganda	Clay bricks	Nkozi, Central Region	Energy consumption in brick production. Comparative assessment. Recommendations for reduced fuelwood consumption
2015	Hashemi, A , Cruickshank, H. Embodied energy of fired bricks: the case study of Uganda and Tanzania. 14 international conference on sustainable energy (SET 2015), Nottingham, UK	Clay bricks	Uganda and Tanzania	Environmental impact of artisan brick making. Evaluation of production processes in order to identify the key areas for improvement
2015	Hashemi, A, Cruicksank, H, Cheshmezagi A, Environmental impacts and embodied energy of construction methods and materials in low income tropical housing. In sustainability 7 (6), pp.7866- 7883.	Burned bricks, iron sheets, concrete	Uganda	Low-income tropical housing with a focus on construction methods and materials. Recommendations to reduce environmental impacts.

Year	Title of Project/Publication	Commodity	Target Locality	Scope and Focus
2015	Nshekanabo et.al(2015): Investigation of the structural performance of Pozzolan- Lime Cement for Low Cost Housing Construction In Uganda	Pozzolana	Uganda	Examines structural performance of pozzolans mixed with lime as a potential substitute to Portland cement in low-strength construction to reduce cost of housing construction.
1989	World Bank; UNDP (1989): Uganda - Energy efficiency improvement in the brick and tile industry.	Clay	Uganda	Evaluation of technical and economic feasibility of means for improving energy efficiency in Uganda
Geology, Mineralogy, Geochemistry And Geophysics				
Commodity-Specific				
2016	Catherine Nyakecho(2016): Status and investment opportunities with particular regards to dimension stones and construction materials	Dimension stones, Construction materials	Country-wide	Locations, status and investment potential for various dimension stones and construction materials
2006	Peter Wilberforce Olupot (2006): Assessment of Ceramic Raw materials in Uganda for Electrical Porcelain.	Clay, Quartz, Kaolin, and Feldspar.	Mutaka deposit (Bushenyi), flint from Lido beach, ball clay and feldspar from Mukono.	Assesment of different deposits for suitability for porcelain / ceramics (mixtures of Ugandan clay, feldspar and quartz). Study of key properties (workability, firing temperature, dielectric and bending).
2002	Nyakairu,G.W.; Kurzweil,H.; Koeberl,C.(2002): Mineralogical, geochemical, and sedimentological characteristics of clay deposits from central Uganda and their applications.	Clay	Kampala area: Kajjansi, Kitoko, Masooli, and Ntawo deposits	Mineralogical and chemical analysis of clay deposits.
N/A	Vincent Kato: Dimension Stone Industry Status In Uganda	Dimension stones	Uganda	Raw material sources, companies currently involved, sector challenges.
1995	Migisha, C. J. R. & Konishi, K. (1995): The Genesis of the Hima Limestone Deposit, SW Uganda.- Berliner geowiss. Abh., A, 175:75-90; Berlin.	Limestone	South Western Uganda	The origin of the Hima Limestone deposit, its composition and genetic models.
2015	Naigaga et.al (2015): Sustainable Mining of Pozzolana in Uganda.	Pozzolana	Uganda	Examines role of regulation in mining activities of pozzolana and assesses Uganda's mining law with regards to sustainable exploitation practices.

Year	Title of Project/Publication	Commodity	Target Locality	Scope and Focus
2013	Buregyeya et.al (2013): Exploratory Characterization of Volcanic Ash sourced from Uganda as a Pozzolanic Material in Portland cement Concrete	Pozzolana	Western Uganda	Reviews methods of pozzolana characterization and application in Portland concrete, tests the strength, flow-ability and flexural strength of different samples.
2002	Nyakairu, G.W.; Kurzweil, H.; Koeberl, C. (2002): Mineralogical, geochemical, and sedimentological characteristics of clay deposits from central Uganda and their applications.	Clay	Central Uganda	Analysis of the chemical and mineralogical composition of clays for brick production.
Multi-Commodity				
2016	Yager, T.R. (2016): The Mineral Industry of Uganda.	Multi-commodity	Country-wide	Review of mineral occurrences, production and potential with broader policy implications, recommendations.
2011	Betty Nagudi (2011): Status of Geological Resources In Uganda	Multi-commodity	Country-wide	Mineral occurrence and deposits, distribution and potential. Broader sector development needs and priorities
2001	Thomas R. Yager (2001): The Mineral Industries of Kenya and Uganda.	Multi-commodity	Country-wide	Review of mineral occurrences, production and potential with broader policy implications, recommendations.
1997	Philip M. Moobs (1997): The Mineral Industry of Uganda.	Multi-commodity	County-wide	Review of mineral occurrences, production and potential with broader policy implications, recommendations.
1965 to 1992	Mathers S J 1994. The industrial mineral potential of Uganda. BGS Technical Report WWC/94/1	Industrial Minerals, construction minerals	DGSM-Entebbe.	Industrial minerals production since 1961 to 1994. Localities.
Socio-economic Research				
2017	Drake Rukundo (2017): Study on Brick cluster development in Uganda(Kajjansi Area)	Clay	Central Region: Kajjansi	Value chain analysis of the formal and informal clay brick makers in Kajjansi Environmental, economic and social impact analysis. Assessment of various business models
2017	Bread for all (2017): Child Labour In the Supply Chain of Lafarge Holcim in Uganda: Unsolved Issues	Pozzolana	Western Region, Harugongo, Kabarole	Child labour. 54 informants including 20 child labourers (aged 12-17 years).

Year	Title of Project/Publication	Commodity	Target Locality	Scope and Focus
2015	Alyebu D, Lokuda, X, Katusiime, J.: Karamoja women in mining development project (KWIMD). Baseline study on Karamoja women in mining development (Rupa & Tapac sub-counties, Moroto District). Ecological Christian organization. n.p	Gold, limestone and marble	Karamoja Sub-Region: Moroto District..	Capacitating women artisanal miners to engage in profitable, responsible mining and extended business activities aimed at reducing poverty
2014	Burnett, M. Evans, J. How can we survive here? The impact of mining on human rights in Karamoja, Uganda. United states human rights watch. ISBN: 978-1-62313-061.	Gold, limestone and marble	Karamoja Sub-Region	Community relations with mining and exploration companies.
2013	Houdet J., Muloopa H., Ochieng C., Kutegeka S. and Nakangu B. (2014). Cost Benefit Analysis of the Mining Sector in Karamoja, Uganda. Kampala, Uganda: IUCN Uganda	Limestone, marble, gold and mineral occurrences	Karamoja Sub-Region	Economic, social and environmental impacts.
2013 and 2014	Kibiswa,C.;Kabongo,I.;Balesesa,T.; Atigonza,S.; Bainomugisha,A.; (2014). The dynamics of conflicts related land and natural resources in Rupa sub county,Karamoja region, Uganda.ECO, Riamiriam, ACODE. Kampala (UG)	Limestone, marble, gold and mineral occurrences	Karamoja Sub- Region: Rupa Subcounty, Moroto District	key drivers of conflict; current and potential role of the key stakeholders.. Occurrence and distribution of different mineral commodities and mining activities;
2006	Birabwa Elizabeth (2006): Small-Scale Stone Quarrying: Its Contribution to People's Livelihoods.	Aggregates	Central Region, Mukono District	Different livelihood outcomes, constraints and opportunities faced by stone quarrying workers.
2006	Jennifer Hinton (2006): A Baseline Profile of Artisanal and Small-scale Mining livelihoods in Kasese district, Uganda	Salt, limestone and lime	Western Region, Katwe-Kabatoro and Muhokya	Multi-livelihood comparison, influence of ASM on poverty at an individual, household and community level
2006	Birabwa, E., (2006). Small Scale Stone Quarrying: A Study of Its Contributions to People's Livelihoods, Case Study in Kasenge Parish, Nama Sub-country, Mukono District, M. Geog. Thesis, Norwegian University of Science and Technology, 146p.	Stone	Mukono	Research into reasons why local people work in stone quarrying and assess the effects of legislation, policy and institutions on their activities
2015	ECO (2015). Baseline Study on Karamoja Women in Mining Development, Rupa and Tapac Sub counties, Moroto District, Report to Bread for the World, 30p	Multi-commodity	Karamoja	Socio-economic data on women in mining, information on current mining business dynamics and mining-related environmental and occupational health risks.

Year	Title of Project/Publication	Commodity	Target Locality	Scope and Focus
2011	Hinton, J.; Kabongo, I.; Kabiswa, C. et al. (2011). The mining and minerals sector in Karamoja region: development opportunities and constraints.	Multi-commodity	Karamoja	Baseline study to determine the significance of mining and minerals sector in Karamoja, highlight key governance issues and assess opportunities
2014	Houdet, J.; Muloopa, H.; Ochieng, C. et al. (2014): Cost Benefit Analysis of the Mining Sector in Karamoja, Uganda.	Multi-commodity	Karamoja	Environmental, social and economic cost-benefit analysis of LSM and ASM in the region to inform improved sustainable mining practices.
2013	G. Wasswa, F. Mugagga, V. Kakembo (2013) Economic Implications of Wetlands Conversion to Local People's Livelihoods: The Case of Kampala-Mukono Corridor(KMC) Wetlands in Uganda	Sand, brick	Kampala area	Assesses the importance of wetlands in the Kampala area to local people, activities around the wetlands being brickmaking and sand quarrying.
Cross-cutting Sector Reviews				
2003-2011	World Bank (2013): Developing Uganda's Mining Sector.	Multi-commodity (Development Minerals, metallics, base metals, etc)	Country-wide.	Overview of SMMRP and its outcomes aiming to create a favorable investment climate in a socially and environmentally sound manner.
2015	ECO, Saferworld, Action AID (2015) Mineral Policy, Law and Fiscal review (2014-15)	Multi-commodity (Development Minerals, metallics, base metals, etc)	Country-wide	Review of the Ugandan mineral legislation and fiscal policy
1997	Katto, E, (1997). Industrial mineral resources and their development for the 21st century; Proceedings of the symposium on investment opportunities in the mining sector in Uganda, P77-88.	Multi-commodity (Development Minerals, metallics, base metals, etc)	Country-wide.	Review of mineral occurrences, production and potential with broader policy implications, recommendations.
1997	Kyagulanyi, D. (1997). The potential for a dimension stone industry in Uganda. Proceedings of the symposium on investment opportunities in the mining sector in Uganda P89-94	Dimension stones	Country-wide.	Review of dimension stones occurrences, properties, production techniques and market demand

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