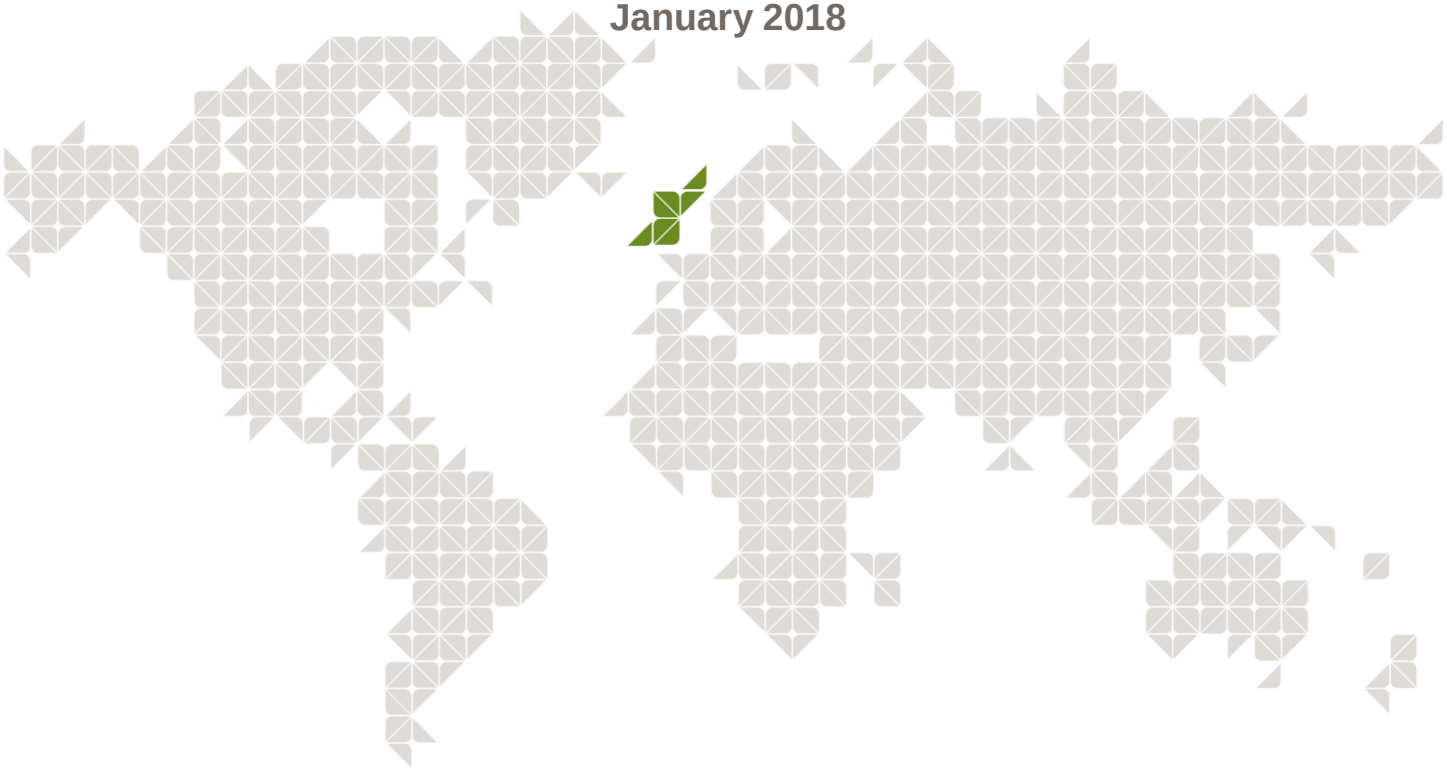
Economic Contributions of Artisanal and Small-Scale Mining in Uganda:

Gold and Clay

January 2018



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About Pact and ARM:

International not-for-profit organisations Pact and ARM are jointly responsible for this report's contents. Both organisations are independent yet partner on a project by project basis to promote and achieve excellence in natural resource management, improve social and environmental responsibility within artisanal and small-scale mining, and assist communities to gain lasting benefit from the more sustainable use of the natural resources around them.

Contents

Abbreviations and Acronyms

3T	tin, tantalum, and tungsten
AIDS	acquired immune deficiency syndrome
AGR	African Gold Refinery, Entebbe
AM	artisanal mining
ARM	Alliance for Responsible Mining
ASGM	artisanal and small-scale gold mining
ASM	artisanal and small-scale mining
BOU	Bank of Uganda
CBO	community-based organisation
CIA	U.S. Central Intelligence Agency
cm	centimetre(s)
DFID	U.K. Department for International Development
DGSM	Directorate of Geological Survey and Mines
DRC	Democratic Republic of Congo
EARF	East Africa Research Fund
EIA	Environmental Impact Assessment
FY	fiscal year
g	gram(s)
GDP	gross domestic product
GLR	Great Lakes Region
GNI	gross national income
GOU	Government of Uganda
ha	hectare(s)
HDI	Human Development Index
HIV	human immunodeficiency virus
ICGLR	International Conference on the Great Lakes Region
IGF	Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development
ILO	International Labour Organisation
kg	kilogramme(s)
km	kilometre(s)
LBMA	London Bullion Market Association
LSM	large-scale mining
m	metre(s)
MEMD	Ministry of Energy and Mineral Development
MWE	Ministry of Water and Environment
NDP II	Second National Development Plan
NEMA	National Environmental Management Authority
NMMPU	National Mining and Minerals Policy of Uganda
OECD	Organisation for Economic Co-operation and Development
PPE	personal protective equipment
SACCO	Savings and Credit Cooperative
SGBV	sexual and gender-based violence
SSM	small-scale mining
SMMRP	Sustainable Management of Mineral Resources Project
STI	sexually transmitted infection
UAE	United Arab Emirates
UBOS	Uganda Bureau of Statistics
UGX	Ugandan shilling
UN	United Nations
USD	United States dollar
VAT	value added tax

Executive Summary

Context

Located in the East Africa region and Great Lakes Region (GLR) of Africa, Uganda is a low-income country with relatively solid economic growth and ambitions to achieve middle-income status by 2020. The minerals sector is expected to play a key role in the nation's economic transformation, as evidenced by its status as one of Uganda's top five priorities in the Second National Development Plan (NDP II). This emphasis is largely tied to Uganda's potential to host large-scale, industrial mines and increased investment in downstream value addition. Indeed, Uganda is endowed with the occurrence of many minerals of economic interest including gold, copper nickel, iron ore, graphite, marble, limestone, and phosphates, among many others. Several industrial mines have also seen production increases in recent years.

Most mineral production and employment is widely attributed to the artisanal and small-scale mining (ASM) sector. The ASM sector's economic contributions are inadequately quantified, poorly understood and, due to high rates of informality, typically excluded from official minerals sector statistics. The Government of Uganda (GOU) has recently afforded ASM greater recognition, including through its prominent inclusion in a draft National Mining and Minerals Policy of Uganda (NMMPU). This policy will provide the basis for upcoming mining law and regulations and related strategies and actions by government. As a consequence, more robust evidence of the significance of ASM and clarity on the opportunities and challenges presented by the sector are needed.

Purpose of this Study

It is against this backdrop that the UK Department for International Development (DFID), via its East Africa Research Fund (EARF), identified Uganda's ASM sector as one of three East African country case studies that aim to assess the current and potential economic contributions at national and sub-national levels, identify specific barriers and opportunities for improved sectoral performance, and outline key recommendations for pro-poor development and broad-based economic growth.

Methodology

In addition to a national overview of the country context, its ASM sector and prevailing policy and legal frameworks, two case study commodities and regions were targeted for more intensive study. The selection process involved two steps.

1. The minerals for study were chosen based on a range of economic, social, and environmental criteria and relevance to DFID programming
2. Representative sites were selected for the size and types of operations and research accessibility.

From these criteria the two areas that were selected were clay and clay brick production in and around the capital city, Kampala, and gold production in the Karamoja Region, an area where widespread poverty and the livelihood impacts of climate change and previous conflicts have, among other factors, severely impeded development. Assessment of case study sites was done qualitatively and semi-quantitatively through literature review, site visits, interviews with key informants, and the appraisal of economic performance of operators.

Key Findings

Key findings are summarised as follows.

- **The value of ASM of clay bricks and gold would, if formalised, increase the GDP by more than 2%. Results herein estimate the total value of ASM of clay bricks and gold to be USD 58 million per year. Furthermore, if formally traded, foreign exchange earnings from gold exports would have reduced Uganda's trade deficit by an estimated 5% and halved its overall trade deficit.**

- **ASM produces a crucial source of much-needed peri-urban employment and means to reduce rural-urban migration.** Direct employment in ASM is estimated at approximately 300,000

jobs, almost half of which are held by women. This includes approximately 40,000 jobs in gold mining and 93,000 jobs in clay and clay brick production.

- **ASM is economically significant to an estimated 5 million Ugandans.** Expenditures of ASM revenues in local economies are estimated to stimulate an additional 750,000 indirect jobs and, based on household size, directly and indirectly benefit approximately 10% of Uganda's population. Furthermore, clay brick production and gold production in Karamoja are, respectively, estimated to inject USD 500 million and over USD 15 million into local economies annually.

- **Women realise fewer benefits from ASM than men, but bear the brunt of negative impacts.** For example, in clay brick production, women hold approximately 15% of the jobs but obtain only around 8% of the revenues. In Karamoja, women constitute 30–80% of the ASM workforce, but exert varying (often little or no) degree of influence on how proceeds are used. Women's economic empowerment is impeded by intensive work burdens, occupational and environmental impacts of mining, and harmful gender norms, beliefs, and values, among other factors.

- **Environmental, occupational, and community health dimensions of the ASM sector warrant targeted attention. In the case of clay bricks, impacts on wetland, and forest resources pose greatest concerns. In Karamoja, occupational risks of ASM are severe and compounded by other serious health concerns related to food insecurity,** alcohol abuse, sexual and gender-based violence (SGBV), and HIV/AIDS and other sexually-transmitted infections (STIs)**.**

- **Child labour is most pronounced in areas of extreme poverty and where ASM is less formalised.** Child labour was found to be an issue in both brick-making across Uganda and gold production in Karamoja, although it is also prevalent in other regions and for other commodities (e.g., salt, stone aggregate, sand). The rates of child labour tend to be higher in sites that are more informal and where participation is poverty rather than enterprise driven.

- **The relatively low achievement of ASM legalisation thus far is due to a lack of attention to the process of formalisation and deficiencies in the current framework.** Legal status is difficult for most artisanal and small-scale miners to achieve, given the current requirements. Furthermore, legalisation is only one dimension of formalisation, the latter of which calls for continuous and sustained support to address multiple technical, environmental, occupational, social, and economic aspects of ASM. Greater consideration is needed of the diversity of ASM operations, its differences from large-scale mining (LSM), financial and administrative capacity of most miners, and the need to promote and enable progressive improvements to the sector.

Recommendations

Promising shifts in political will and current policy and legal reform processes create an important opportunity to realise the development potential of the ASM sector and to address related risks. Key recommendations from this work are summarised as follows.

Formalisation Activities Should Be Furthered

- **Government needs a formal, integrated strategy for the formalisation of the ASM sector.** This should identify and clarify goals and objectives, mandates, inter-agency coordination arrangements, activities, budget, and financing needs. This would be strengthened by clearly defining government mandates for ASM formalisation within the law and regulations.

- **Formalisation strategies must be integrated with legalisation strategies.** Licensing of ASM activities is only one dimension of formalisation. Considerations include capacity building of ASM operations on key topics, creation of economic incentives for formalisation, creation of targeted policies and programmes to empower the most vulnerable groups and rectify gender inequalities, and mechanisms to support gender-inclusive organisation of miners in legal entities, among others.

- **New legislation is currently being formulated and should adequately account for existing gaps and international best practice.** Legal reforms should allow for two separate types of ASM licences (artisanal and small-scale) and the characteristics of mining titles (size, duration, renewal

requirements, transferability) should be in line with international and regional best practice and the reality on the ground. In addition, requirements for the attribution, maintenance and renewal of licences must be simplified in accordance with the two categories recommended (artisanal, small-scale).

- **Support formalisation of ASM supply chains,** particularly for gold, tin, tantalum and tungsten. Recent statements by the President of Uganda indicate that the royalty on artisanal and small-scale gold mining (ASGM) may be eliminated, a move that is likely to substantially increase gold capture within formal trading chains. Planned legislation should draw from lessons learned from other jurisdictions, while recognising existing Ugandan systems of ASM production and trade to develop workable solutions suited to the country.

Targeted Trainings for Diversity of ASM Stakeholders Needed

- **Emphasise human capacity development in the ASM formalisation strategy.** Targeted training, campaigns, and strategies for a range of topics have been identified, ranging from technical and occupational aspects to business skills development to organisation formation and strengthening. Capacity building should extend beyond miners to ASM authorities mandated to support formalisation.

- **Ensure special emphasis is given to gender risks and opportunities in design and implementation.** This calls for assessment of gender risks and impacts of any proposed policy, law, and technical intervention prior to implementation. Gender inequalities in the distribution of benefits and risks from ASM can also be addressed through targeted training of women, coupled with specific efforts to counter discriminatory beliefs and norms and to challenge barriers women face in obtaining higher-paying and more influential jobs in and around mines.

All Formalisation Efforts Should Be Closely Monitored

- **Establish systems for evidence-based decision making and robust monitoring and evaluation of progress towards formalisation.** This will require formal coordination between multiple actors, including the Directorate of the Geological Survey and Mines (DGSM), the Uganda Bureau of Statistics (UBOS), customs authorities, and others. The first step is to jointly develop and implement an ASM census.

With recognition of the substantial economic development potential and livelihood significance of ASM, numerous countries around the world are now acting to put in place and sustain commitments to formalise ASM. Uganda is extremely well positioned to move toward and achieve best practice in this respect. Current policy and legal reform processes provide an excellent platform for change, political will and awareness of ASM seem to be on the rise, and ASM clearly has a role to play in the economic development of the nation. If promised objectives in the current draft minerals policy are transformed into conducive law and institutional action, Uganda can achieve sustained, progressive improvements in ASM as needed to realise its full development potential.

1. Introduction

Bounded by Kenya, Tanzania, Rwanda, South Sudan, and the Democratic Republic of Congo (DRC), Uganda was one of the World's 15 fastest-growing economies from 1987–2010[1]. Gross domestic product (GDP) growth now stands at a solid 5.2% per year, and over the past two decades the country has achieved impressive gains in poverty reduction, literacy, education, and other critical areas[2,3]. Despite these gains, Uganda continues to grapple with a number of development challenges, including those resulting from an exceptionally high population growth rate and, with a median age of 15.7, one of the world's youngest populations[4]. An estimated 700,000 people annually enter Uganda's highly competitive job market, yet the absorption capacity of most sectors is low and options are mainly limited to the country's agriculture sector[5,6].

In recognition of this, the Government of Uganda (GOU), in its Uganda Vision 2040, has prioritised job creation alongside major efforts to spur industrialisation and economic growth[7]. The mining sector is expected to play a key role in the nation's economic transformation, as evidenced by its status as one of Uganda's top five priorities in the Second National Development Plan (NDP II)[8]. In this respect, the NDP II and related efforts primarily focus on creating the conditions needed to encourage investment in mineral exploration, large-scale industrial exploitation, and downstream value addition.

Despite the emphasis on industrial mine development, a significant proportion of Uganda's mineral production and related sources of employment are widely attributed to artisanal and small-scale mining (ASM). In 2008, the ASM sector produced more than 90% of most metallic and industrial minerals, ranging from gold, tin, and tungsten to stone aggregate, sand, and clay. Then, the sector was estimated to provide livelihoods for more 190,000 Ugandans, well above the approximately 2,000 jobs provided by the formal industrial mining sector at the time[9].

Over the past decade, Uganda's ASM sector is believed to have grown significantly in terms of both production and employment. With this growth, disputes with larger private sector actors seem to have increased in frequency and intensity, resulting in greater awareness of ASM by government and civil society. Given high rates of informality, low contributions to official state revenues, and lack of robust statistics on ASM, much of this attention mainly has focused on negative aspects of the sector. This includes the crude, labour-intensive methods and related environmental, occupational, and social risks. However, a promising shift seems to be underway. Civil society and government efforts to engage sector stakeholders in dialogue, mainly in conjunction with current policy and legal reform processes, has led to increased recognition of the economic development potential of ASM and a growing number of projects and programmes to harness this potential.

It is against this backdrop that the U.K. Department for International Development (DFID), via its East Africa Research Fund (EARF), identified Uganda's ASM sector as one of three East African country case studies for assessing the current and potential economic contributions of ASM at national and sub-national levels, identifying specific barriers and opportunities for improved sectoral performance, and outlining key recommendations for pro-poor development and broad-based economic growth.

1.1. Purpose of this Study

Together with parallel case study reports in Kenya and Rwanda, the Uganda case study informs a global analysis on the 'Impact of Small-Scale Mining Operations on Economies and Livelihoods in Low to Middle Income Countries', providing an invaluable contribution to the ASM discourse and clear

[1] GDP growth averaged 7.2% per year from 2007-2010. Data source: www.worldbank.org/en/country/uganda/overview.
[2] Data sources: www.undp.org/content/dam/undp/library/MDG/english/MDG%20Country%20Reports/Uganda/Uganda%20MDG%20Report-Oct%202013.pdf and www.countryeconomy.com/hdi/uganda.
[3] Data source: http://www.worldbank.org/en/country/uganda/overview.
[4] Population growth is of currently 3.2% per year. GOU 2010
[5] World Bank 2016a
[6] In 2013, 71.9% of employment was attributed to the agriculture sector. Data source: www.data.un.org/countryprofile.asp?crName-uganda
[7] GOU 2010
[8] NPA 2015
[9] MEMD 2009

direction for increasing the contribution of ASM to economic growth, inclusive development, and good governance of the sector.

Specifically, this study aims to increase the evidence base on the economic contributions of the ASM sector in Uganda, provide insights on how the sector is formally and informally coordinated, and profile the nature and extent of associated risks and benefits and how and to whom they are distributed. With a focus on two economically significant mineral commodities (gold and clay), reviewed through field studies, the case study specifically seeks to identify how the economic development potential of ASM can be realised as economic, environmental, health, and social risks are mitigated.

1.2. Methodology

The research design precluded a country-wide, multi-commodity assessment. Instead, in consultation with DFID, two supply chains and regions were selected for more intensive research: gold in the Karamoja Region and clay and brick production in and around the capital city, Kampala. For both commodity and study site selection, key criteria included economic significance in terms of production and employment levels; diversity of the commodities (one precious metal, one construction mineral); level of women's participation; environmental, occupational, and/or social significance; and relevance to the GOU, DFID, and other stakeholders. Selection of the Kampala region for clay production also was based on the intensity of activities, while selection of Karamoja Region for gold was informed by DFID's programmatic priorities in Uganda.

The Uganda case study employed a combination of methods, tools, and approaches. These included, among others, interviews, focus group discussions, and consultations with a broad range of government, civil society, and private sector stakeholders; supply chain, stakeholder, and gender analyses; and site-based assessments. Field studies were supplemented by an extensive review of published and grey literature, research, and publications and of existing government databases and datasets and a comprehensive review of relevant policy and legislation, including policy related to child protection. Primary research in selected sites provided qualitative and semi-quantitative data and information through interviews and focus group discussions with key stakeholders and on-site appraisals of economic, technical, environmental, organisational, and social conditions in the operations. All national, sub-regional, and local data collection in Uganda was conducted in mid-2016 within a seven-day period.

1.2.1 Limitations

The country case study makes no claim of reflecting a comprehensive country-wide ASM sector analysis, nor supply chain analysis for all commodities, nor, in the case of gold, conditions outside the Karamoja Region. Nevertheless, reasonable efforts were made to account for the variable strength and quality of evidence. The reliability of primary data was supported through triangulation with different sources in the field and, where available, validated and supplemented by previously published data, reports, and other publications. In the case of secondary data, statistics provided by the Uganda Bureau of Statistics (UBOS) and other reputable institutions (Bank of Uganda [BOU], World Bank, the United Nations [UN], and the U.S. Central Intelligence Agency [CIA]), particularly related to macro-economic indicators and population demographics, are deemed to be reliable.

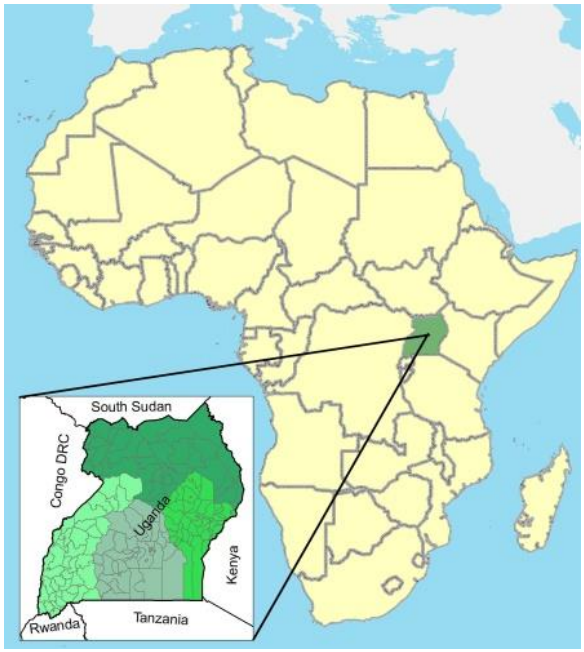
Given the informality of the ASM sector, government mineral production databases largely exclude ASM. Furthermore, prior research, even where rigorous by academic standards, largely reflects conditions at specific sites at a certain time. Thus, attention was paid to how pre-existing and newly generated estimates of employment and production levels were used to extrapolate macro-economic contributions. As cited throughout the report and detailed in the annexes, estimations of employment, production, production value, and related multiplier effects (e.g., spin-off employment) were extrapolated to national levels using a combination of primary data collected in the field, best available data from prior research, and, where available, statistics from reliable government sources. This is discussed further in relevant sections of the report. In addition, conclusions and recommendations have been provided concerning critical data needs. By definition, any extrapolation bares the fact that it approximates the reality, rather than being 100% correct. These extrapolations are valuable because they give the general magnitude of the economic impact of ASM nationally.

2. The ASM Context in Uganda

2.1. Country Overview

Uganda is a landlocked country located within both the East Africa region and African Great Lakes Region (GLR). The climate is semi-arid in the northeast (Karamoja Region) and within the Great Rift Valley in the west, but is mainly tropical across the rest of the country. The average elevation is relatively high (approximately 1,100 m), and water resources cover approximately one-sixth of the country's area of 241,000 km^2.

Figure 1: Location Map



Uganda has a very young, fast growing population of 38.3 million that is culturally and linguistically diverse. Among over 30 ethnic and tribal groups, the most populous include the Baganda (16.9%), Banyankole (9.5%), Basoga (8.4%), Bakiga (6.9%), Iteso (6.4%), Langi (6.1%), among many others (45.8%)[10].

2.1.1. Political Context

Uganda is a presidential republic. The colonial boundaries created by Britain to delimit Uganda grouped together multiple ethnic groups with different political systems and cultures. These differences complicated the establishment of a working political community after independence in 1962, culminating in dictatorship and brutal civil unrest between 1971 and 1985[11].

President Yoweri Museveni came into power in 1986, following an overthrow of the previous regime and bringing relative stability and economic growth to the country. Following a 2005 constitutional referendum that cancelled a 19-year ban on multi-party politics and lifted presidential term limits, Museveni was successfully re-elected in 2006, 2011 and 2016. Over the first two decades of Museveni's rule, the country faced an insurgency in the north and mainly tribal conflicts in the northeast. Today, Uganda is largely peaceful, despite challenges in attaining full democratic progress, linked mainly to corruption, underdeveloped democratic institutions and human rights abuses.[12]

Traditional leaders of the country's many and long-standing tribal kingdoms play an important role in Ugandan society, including local and national politics. While kingdoms are recognized formally in the Ugandan Constitution, they do not enjoy full political sovereignty. Consistent flashpoints with the national level government include management of natural resource payments and – critically—land tenure. Traditional land rights and formal land rights remains an unresolved issue and occasionally displays itself in physical violence and wariness towards the central government's attempts at land reform or delineation. This further complicates mining sector development as surface rights may be disputed for the above stated reasons.

2.1.2. The Economy

With a gross national income (GNI) of USD 670 per capita in 2015, Uganda is considered a low-income country. Despite its economic classification, Uganda experienced a period of post-conflict rebound, macro-economic stability and investment between 1987 and 2010. This largely has been attributed to stabilisation and pro-market structural reforms that led to gross domestic product (GDP) growth remarkably averaging 7% per annum in the 1990s and 2000s.

[10] CIA 2016
[11] World Bank 2016a, CIA 2016
[12] Ibid

However, over the past decade, greater economic volatility and declines in the GDP have reduced growth to approximately 5% in 2016. With population growth rates of more than 3% through these two decades, per capita income growth decelerated from 3.6% in the 1990s to about 2% at present. Nevertheless, the economy is projected to grow at approximately 5.9% and 6.8% in the 2016/2017 and 2017/2018 financial years, respectively. Medium-term continuity of this upward trajectory depends on whether planned major infrastructure projects and petroleum production are achieved[13].

The Informal Economy

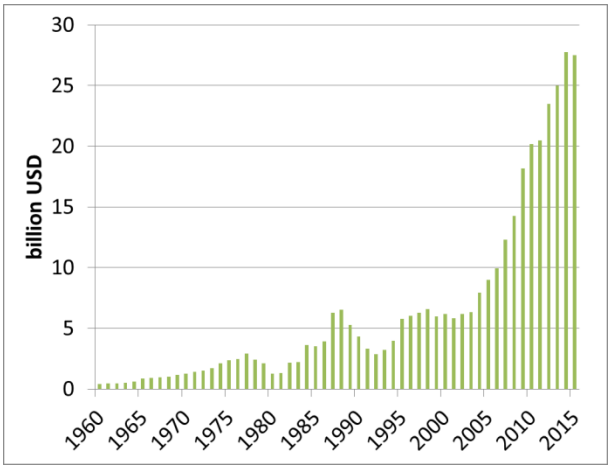
The informal economy plays a critical role in Uganda's economic development, currently accounting for more than 50% of GDP. More than 80% of Uganda's labour force works in the informal economy, mostly in the agriculture sector (71.9%), followed by trade, service, and other sectors[14].

Although 95% of ASM activities are estimated to be informal[15], they are largely excluded from statistics on the informal economy. Nevertheless, ASM's contribution is believed to be significant. For example, in 2008, 'formal' mining and quarrying officially comprised 0.3% of GDP, but had informal ASM been captured in these statistics, the contribution of the minerals sector would have been approximately 3.5%[16].

ASM is one of several informal economic sectors (e.g., agriculture) that face difficulties accessing rights, financing, and technical support[17]. With only 11% of credit in Uganda going to the rural economy[18] and only one in 10,000 entrepreneurs able to successfully obtain credit[19], informal sectors are essentially consigned to relying on unregulated loan sharks[20]. This is compounded by difficulties in setting up formal enterprises. The 27-day process is characterised by burdensome procedures, complex tax regulations, risks of corruption and high costs[21,22].

Women may face even greater obstacles in these respects. Despite supplying 70–80% of agricultural labour, only 30% of women control proceeds from land they work[24]. A study of women's access to credit from Savings and Credit Cooperatives (SACCOs) in Uganda found constraints ranging from gender norms that assign financial management roles, to men (including decisions concerning women's incomes) to the lack of both collateral and an understanding of products and procedures, to low self-esteem, illiteracy, fear, and mistrust, among others[25].

Figure 2: Uganda GDP (current USD)[23]



2.1.3. Human Development

Uganda surpassed the Millennium Development Goals' target on halving poverty by 2015 and made significant gains in reducing the percentage of the population suffering from hunger and in raising gender equality and women's economic empowerment. However, a large proportion of the country's population is highly vulnerable to falling back into poverty, particularly given the increasing strain on education, health care, and other systems

[13] World Bank 2016a
[14] Data source: http://data.un.org/countryprofile.asp?crName-uganda
[15] Crawford et al. 2015
[16] MEMD 2009
[17] Ibid; e.g., Many farmers cite key obstacles as lack of property rights in the form of land titles and poor access to extension services and credit
[18] Bank of Uganda
[19] World Bank 2016a
[20] Rugasira 2016
[21] World Bank 'Doing Business 2016' report
[22] Rugasira 2016
[23] Data source: http://data.worldbank.org/indicator
[24] Ovonji-Odida et al. 2000
[25] Cited in GIZ 2010

imposed by one of the highest population growth rates in the world[26]. When coupled with a population density of 195 persons per km^2, undue pressures on the environment pose additional risks to national sustainable development objectives[27]. The country also faces severe regional inequalities, with persistently high poverty rates plaguing the Northern region.[28] With a Human Development Index (HDI) of 0.483 in 2014, Uganda ranks (jointly with Rwanda) 163 out of 188 countries[29].

2.2. The Minerals Sector

2.2.1. Sector Overview

Although iron and salt have been produced in Uganda for centuries, mining only emerged as a major economic contributor in the 1950s to mid-1970s[30]. This milestone was marked by the establishment of the Kilembe Copper Cobalt Mine, the largest mine in the country thus far, and several small, semi-mechanised lead, tin, wolfram, and coltan mines in the southwest[31]. In this period, these mines were the third largest GDP contributor after coffee and cotton and made up 35% of foreign export earnings[32].

Civil unrest under Idi Amin's regime led to the collapse of the formal mining sector in the late 1970s. Related retrenchment of more than 10,000 mineworkers nevertheless provided an important catalyst for the growth of ASM across the country[33]. In 1986, when the country's situation normalised, the government's economic development plan focused largely on agricultural production and exports and the formal, industrial mining sector continued to decline[34]. However, informal ASM escalated in this period, particularly following legalisation of gold mining by Presidential Decree and artisanal discoveries spawning gold rushes in eastern, central, and southwest Uganda[35]. As both the population and economy rapidly grew and with it rural-urban migration, the demand for industrial building minerals also surged. This resulted in the establishment of mining operations, from artisanal to large-scale, producing a range of construction materials, including stone aggregate, sand, clay, and limestone.

Over the past 10 years, the formal minerals sector has experienced an annual growth rate averaging 10.9%[36]. Much of this is attributed to promulgation of an investor-friendly Minerals Policy (2001), Mining Act (2003), and Regulations (2004) and to financial support provided to the GOU from agencies such as the World Bank, the Nordic Development Bank, and the African Development Bank under the Sustainable Management of Mineral Resources Project (SMMRP). A broad range of critical actions was taken to reactivate the mining sector, including geologic mapping, modernisation of the mining cadastre, investment promotion efforts, and a range of other measures.

Although the global economic crises and low metal prices have substantially reduced exploration expenditures, mineral exploration is ongoing for gold, graphite, uranium, rare earth elements, iron ore, copper, nickel, and chromium, among others. Exploration has led to the identification of a number of economic deposits, and large-scale mines are currently under development for phosphates and iron ore, copper-cobalt, and marble. Medium- to large-scale production is currently undertaken for a range of minerals, including industrial minerals, such as limestone, pozzollana, kaolin, stone aggregate, clay bricks, and vermiculite, and metallic minerals, mainly gold and tin, tantalum, and tungsten (3T).

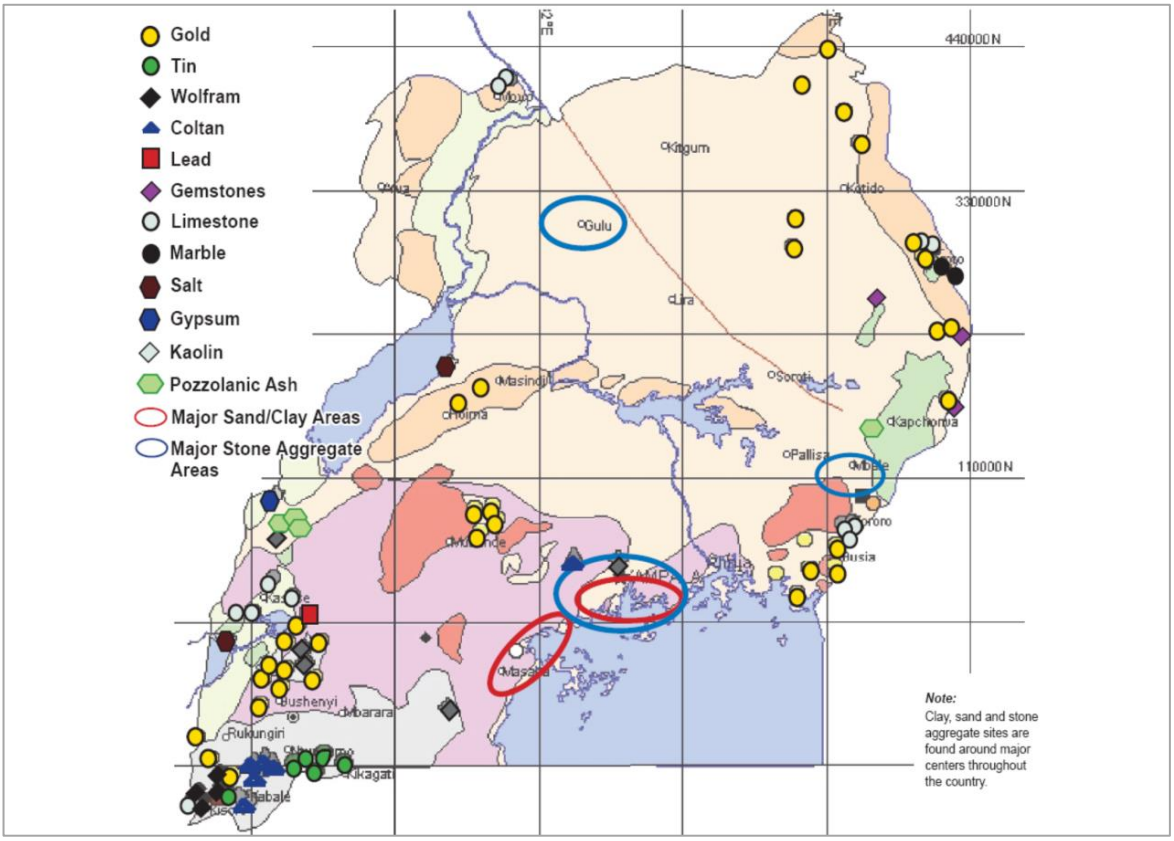
Resulting from these gains, total investments in mineral exploration increased from USD 5 million in 2003 to USD 340 million by the end of 2011, with revenues from licence fees increasing in the same

[26] In 2015, the fertility rate was estimated at 5.7 children per woman and almost half of the populace were under the age of 15 years. World Bank 2016a
[27] Data source: www.cia.gov/library/publications/the-world-factbook/geos/ug.html.
[28] World Bank 2016a
[29] UNDP 2016
[30] Tuhumwire 2002
[31] Ibid
[32] Hester and Boberg 2006
[33] Hinton 2012
[34] Crawford et al. 2015
[35] Hinton 2012
[36] DGSM Annual Reports (2008–2016)

time from USD 500,000 to USD 14.6 million[37]. Mineral concessions also have increased dramatically from 100 mineral licences in 2003 to 818 licences by the end of 2015.[38]

As discussed further in section 5, ASM of minerals is largely excluded from official contributions, the exception being a proportion of gold, 3T, limestone, and marble production. In addition to these commodities, artisanal and small scale miners also produce salt, stone aggregate, sand, clay, iron ore, and stone for dimension stones (tiles, counters).

Figure 3: Active ASM areas in Uganda[39]



2.2.2. Mining Sector Stakeholders

The ASM sector in Uganda is characterised by multi-faceted challenges and many different stakeholders. In addition to the lead agency, the Ministry of Energy and Mineral Development (MEMD), other key stakeholders include the National Environmental Management Authority (NEMA) and Ministry of Water and Environment (MWE); Ministry of Gender, Labour, and Social Development; Ministry of Health; Uganda Revenue Authority; Uganda Police Forces; and many others. Many of these institutions have decentralised offices at district and sub-county government levels. Due to their proximity to ASM areas and complementary mandates, some local government offices may be better positioned to address certain issues at the grassroots level, particularly if coordination mechanisms with mining authorities, described below, is strengthened and requisite capacity is developed[40].

MEMD provides policy direction for the minerals sector and oversees and provides guidance to the Directorate of Geological Survey and Mines (DGSM) on its mandates and functions. The Minister plays a key role in arbitration of disputes and conflict resolution and on issuing statutory instruments and promoting the sector[41].

[37] DGSM 2012
[38] Mining Journal 2012; DGSM 2016
[39] Hinton 2012
[40] Ibid
[41] Ibid

The DGSM is the technical and administrative body responsible for implementation of the Mining Act (2003) and Regulations (2004). It is also the lead agency under the National Environment Act for environmental issues in the minerals sector, including related inspections, reviews, and recommendations on Environmental Impact Assessments (EIAs) and environmental audits. Furthermore, it is responsible for granting and monitoring performance for all mineral licences; collecting and disseminating production statistics; and collecting, analysing and reporting on geo-data and information. No special department exists to oversee the ASM sector, but under the Minerals Policy (2001), DGSM has a mandate 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'. The ASM mandate of DGSM is likely to be strengthened under proposed policy and legal reforms, which are currently under review. Most DGSM activities occur via the central DGSM office in Entebbe, with regional offices located in Mbarara, Kabale, Tororo, and Moroto Towns, each of which face significant resource constraints[42].

MWE sets national policy and standards and regulates and monitors issues related to water and the environment. One of its parastatals, **NEMA**, coordinates with DGSM, NFA, and other relevant government agencies to ensure appropriate application of environmental legislation, including EIAs and monitoring of their implementation in the minerals sector, and oversees District Environment Officers, whose functions may include inspection, monitoring, and provision of guidance to ASM area[43].

Under the **Ministry of Local Government (MOLG)**, the **District Administration** receives, reviews, and forwards applications for mining and exploration rights in line with the current first-come, first-serve requirements. The district administration is also mandated to arbitrate compensation disputes and resolves other conflicts. Particularly relevant to the diverse challenges facing ASM, **district and sub-country local governments** are staffed by a range of officers, all of whom are overseen by their respective line ministries. Of relevance to ASM, those ministries include those responsible for community development, health, labour, environment, and land-related issues[44].

More than **20 ASM associations**, three regional associations, and the **National Artisanal and Small-scale Miners Association (NASMA)** have been formed in Uganda. NASMA has been largely inactive, though its members from around the country continue to engage each other informally[45]. The private sector also supported is by the **Uganda Chamber of Mines and Petroleum**, which plays a role in lobbying and advocacy, as well as in investment promotion, most of which is focused on priorities of larger sector actors, including those related to harmonisation between ASM and large-scale mining (LSM).

2.2.3. Legal Framework for ASM

Review of Ugandan Legislation on ASM

This section analyses the main legal aspects that have the potential to either positively or negatively impact the legalisation of the ASM sector. It is not an exhaustive analysis of the legal instruments identified below, and additional details are provided in Annex 2.

It is important to recognise that a revised National Mining and Minerals Policy of Uganda (NMMPU) has been drafted and is under final review. The corresponding review and consultative process (as well as comprehensive benchmarking, including on ASM legislation) has been underway for more than three years, including by an Inter-Ministerial Task Force. The new minerals policy will provide the basis for promulgating related sector legislation in response to many of the gaps identified since the previous Mining Act (2003) and Regulations (2004) were enacted, some of which are echoed in the analysis below. Importantly, ASM and its broader development opportunities and constraints receive far more prominence than in the previous policy. Furthermore, draft Environment Act and Environmental Assessment Regulations are currently being finalised. Likely because of increased coordination between mining and environment authorities over the past decade, this draft legislation

[42] Ibid
[43] Ibid
[44] MEMD 2009
[45] Hinton 2012

explicitly recognises ASM as distinct from industrial LSM and provides more reasonable criteria for compliance. The analysis of the legislation in this section seeks to support these processes.

The current legal mining framework is composed 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 mining sector:
- The National Water Resources Regulations, 1998
- The National Environmental Management Regulations, 2000
- The National Environmental Regulations, 2001
- The Occupational Health and Safety Act, 2006
- The Employment Act, 2006

Additionally, the following policies also have some applicability to the mining sector:
- The National Gender Policy, 1997
- The National Child Labour Policy, 2006
- The National Action Plan on the Elimination of the Worst Forms of Child Labour, 2012

Although the legislation appears to be comprehensive, modern mining legal frameworks tend to have specific laws and regulations for occupational health and safety and environmental provisions, with the objective of addressing the specificities of the mining sector. Adequate inclusion of specific issues associated with ASM in related laws and regulations are increasingly more common. In Uganda, these areas are currently under generic legal frameworks, which, in the case of the ASM sector, may create significant obstacles to its legalization.

Furthermore, it is important that subjects like child labour and gender equality are intensively addressed through national action plans and strategies, particularly given cross-cutting linkages to gender norms and beliefs, socio-cultural traditions, and poverty and its correlates, such as education and health status. Given the risks associated with child labour in ASM, the child labour policy and action plan would be strengthened by integrating specific issues and measures to address them in the sub-sector, at the very least with a similar degree of emphasis as that given to other economic sectors.

Alignment with the IGF

The mining sector, including ASM, was the subject of a recent assessment conducted in collaboration with the Ugandan government to support the implementation of the Mining Policy Framework of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), of which Uganda is a member[46]. Several strengths and weaknesses of the ASM formalisation process in Uganda identified within the IGF analysis provide some good substance for the authors' evaluation offered below.

Primary strengths

- **Location licence dedicated to ASM operations.** ASM is recognised in mining law.
- **Location licence applications require a description of how the environment will be protected by the mining operation(s)** and measures taken to mitigate these impacts. Applicants must also list reclamation and rehabilitation activities.
- **Some capacities for training and technical support have been developed**, mainly through the SMMRP[47].
- **Uganda has developed a National Action Plan on the Elimination of the Worst Forms of Child Labour.** This policy objective is further supported by Uganda's signing of the UN

[46] Crawford et al. 2015

[47] Specifically, the project trained 180 local trainers to educate Artisanal and small-scale minerArtisanal and small-scale miners on practical mining-related topics and trained over 1,000 artisanal miners around the country and supported the formation of 50 ASM associations focused on production and marketing. Much of this was undertaken via a 22-member inter-agency committee, inclusive of an environmental and social unit within DGSM, and counterparts in NEMA, the Ministry of Health, NEMA, and other key bodies. MEMD 2009 Although the inter-agency model was deemed to be useful, efforts were reduced significantly upon completion of the SMMRP.

Convention on the Rights of the Child and International Labour Organisation (ILO)'s Convention on the Worst Forms of Child Labour.

Primary limitations

- **Despite the introduction of location licences and inclusion of ASM in the Mining Policy (2001), there is no long-term strategy to formalise or fund the ASM sector.** One of the results of the lack of strategy is that fewer than 5% of Artisanal and small-scale miners hold a location licence[48].
- **The Mining Policy includes provisions for extension services and support for fair market access, but these services are not part of DSM or local government progmes or budgets.** The consequence is that very little has been done and the activities that had external financial support did not continue as part of DGSM activities beyond SMMRP.
- **Many artisanal and small-scale miners have little or no knowledge of the legislation governing mining.**
- **There are significant costs for and bureaucratic barriers to obtaining a location licence, in addition to yearly fees, reporting requirements, and taxes.** The fees and taxes for obtaining and maintaining a location licence can be high for an artisanal and small-scale miner: UGX 500,000 (approximately USD 145) for application preparation; UGX 100,000 (USD 29) for registration; and an annual mineral rent of UGX 200,000 (USD 58). In addition, licence holders must pay royalties on their production[49].
- **As the quantity of land covered by exploration licences has increased, land available for ASM activity has been reduced.** Much of the country's ASM activities take place on land already claimed by exploration licences and mining leases and, therefore, is unlicensed, informal, and, at times, contentious. DGSM is supposed to mediate disputes between ASM operations and third parties, as noted in Section 61 of the Mining Act. While DGSM reports success in such mediations, the Directorate's number of staff and resources to regularly engage in such mediations is limited.
- **Most alluvial ASM takes place in areas larger than those permitted by a location licence**, in many cases in areas exceeding 16 ha. These miners would require multiple location licences to realistically cover the area in which they work.
- **Occupational health and safety legislation applies to all economic sectors.** The specificity of the mining sector, particularly of ASM, is not captured. For example, mercury and cyanide use could be included with simple but effective measures within ASM occupational health and safety legislation.
- **A policy mandate exists without an institutional base to support formalisation of ASM.** It is unclear which institution(s) are supposed to provide extension services, advisory support, and awareness-raising campaigns for artisanal and small-scale miners, including the mechanisms to promote coordination and collaboration between them.

Lesson learned: The ASM policy and legal framework limitations described show that, in order for the location licence to be effective as one of the tools to promote legalisation, it needs to be customised to ASM operations. This includes simple but effective requirements, taxes, and fees that artisanal miners can meet and access to land or free areas that are not already granted for purposes of exploration or LSM.

The role of the government in supporting the implementation of the policy and legal framework is particularly important for the ASM sector. The clarity of roles, budget allocations, and technical and administrative capacities are crucial. Without this clarification, the policy amounts to good intentions that likely will never see implementation.

[48] With support from the SMMRP, MEMD articulated a comprehensive National ASM Strategy in 2009, inclusive of goals and objectives, work plans and budgets, M&E frameworks, roles and responsibilities and other aspects. The authors contend that factors contributing to lack of uptake may include lower political will and limited institutional resources compared to that observed at present in conjunction with emergence of other priorities (e.g., growing attention to the petroleum sector). MEMD 2009

[49] The amount of USD was updated from the report Crawford et al. 2015 based on the same currency rate used throughout this report. Other adjustments have been made in related references.

Positive Shifts in Ugandan Policy

In line with the Uganda Vision 2040 and the NDP II and as demonstrated by current policy and legal reform processes, the GOU is giving greater prominence to the mining sector. With respect to ASM, a shift in political landscape is being exhibited at the highest levels. For instance, in a speech on 20 February 2017, President Museveni cited employment, GDP, and value added tax (VAT) contributions of ASM and barriers to formalisation as the basis for eliminating the royalty on production from artisanal and small-scale gold mining (ASGM).

The shift is evident in the draft NMMPU. Specifically, Objective 15 states a commitment to 'organise, license, regulate and transform artisanal and small-scale mining into viable and sustainable mining entities in Uganda'. Additionally, Objective 19 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'[50].

The draft policy defines strategies to achieve Objective 15 as:

(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 prog 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.

It is important to highlight that these strategies seek to reduce barriers to legalisation while acknowledging that legalisation is only one dimension of the formalisation process, the latter of which calls for continuous and sustained support to address multiple technical, environmental, occupational, social, and economic aspects of ASM. Most of these dimensions are crucial to achieve formalisation of the sector[51,52].

The strategies of Objective 19 include:

(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

[50] 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. Cleary, 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.
[51] SDC 2011
[52] Barreto 2011

(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.

These strategies are particularly important because they seek to rectify the prior exclusion of these construction minerals from minerals sector policy and governance. Prior to 2006, artisanal and small-scale production of construction minerals, such as 'clay, murram, sand or any stone commonly used for building or similar purposes' was constitutionally excluded from the jurisdiction of mining authorities[53]. Consequently, and despite some efforts by the DGSM to clarify overlapping mandates, multiple government agencies—local governments and environmental authorities, in particular—continue to play roles in authorising, regulating, and taxing activities. To date, this situation has provided unique constraints to formalisation of clay activities and other industrial minerals. Objective 19 suggests a clear intent to rectify this situation.

It is important to mention that formalised ASM operations are still a small portion of all ASM in the country, but there have been increases in the number of ASM sites licenced in recent years. DGSM annual reports covering 2011–2015 indicated modest numbers of active location licences, never exceeding a total of 60[54,55]. In December 2015, the number of active licences was 54, 12 of which were pending renewal, and 36 in application. In prior assessments, this low performance was attributed to overlapping areas of interest to larger sector actors (exploration and mining companies), combined with the levels of complexity and costliness of administrative and requirements to obtain and maintain such a licence[56].

International coordination

Uganda has been quick to align with some internationally supported reforms and slower with others.

Minamata Convention on Mercury

Uganda signed the Minamata Convention in 13 October 2013. Ratification is pending. The lead agency is the National Environmental Management Authority (NEMA). To date Uganda has embraced the convention, NEMA having received training on data collection methodologies and being near completion of its mercury inventory that estimates the amount of mercury in use and from what sources. The next step is the development of its National Action Plan. In previous consultations with stakeholders by consultancies such as COWI and others, miners also express a high interest in reducing mercury use. A key gap for implementation will be practical and sustained engagement strategies with ASM once the convention becomes law. Currently it is common for AM to disperse quickly when seeing NEMA agents.

Conflict Minerals alignment

Uganda is part of the GLR and due to its border with DRC it is subject to provisions of section 1502 of the United States' 2010 Dodd Frank Act, which aimed to disentangle mining revenues from the complex conflict in the DRC. Uganda is also a party to the ICGLR, which since 2006 has taken progressive steps to agree on mineral traceability in the region. These steps culminated in a special summit of the GLR countries was held in 2010 in Lusaka, where the six tools of the Regional Initiative against the Illegal Exploitation of Natural Resources, were approved. The summit also affirmed the ICGLR's endorsement of the Organisation for Economic Co-operation and Development (OECD) Due Diligence Guidance on Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas[57] (DDG).

The government has been slow to implement the ICGLR Regional Certification Mechanism (RCM). In May 2017 the statutory instrument needed to begin implementation of the RCM was passed by the Ugandan Parliament and its signature is expected in 2017. Pressure to begin this process was largely driven by affected 3T industry, which had been finding difficulty in exporting its mined 3T materials without the ICGLR certificates. Part of the slow implementation may have been due to stakeholders of

[53] Tuhumwire & Hinton 2006
[54] World Bank 2013
[55] DGSM 2012; DGSM 2013; DGSM 2014; DGSM 2015; DGSM 2016
[56] MEMD 2009
[57] ICGLR & PAC 2012; ICGLR 2011; OECD 2016 (in its first edition); UNECA 2013

the status quo who will now find themselves having to verify production, face new types of scrutiny from auditors, and otherwise operate within the rules of available 3T traceability and due diligence systems. Sensitization and capacity building is now needed with government and affected stakeholders on proper protocols and procedures. Like other contexts, uptake will remain a challenge with gold because export markets do not universally demand documentation of origin.

2.2.4. Characteristics of Location Licence

The Mining Act (2003) defines one licence for ASM activities. As much as this is an important step, some improvements could substantially help in further promoting legalisation[58].

Table 1: Characteristics of the location licence[59]

Mining rights	• Prospecting, mining, and trade rights
Classification of small-scale operations	• Expenditures up to 500 currency points to bring the mine into production • No use of specialised technology
Eligibility	• Natural person: citizen of Uganda • Corporate body: citizens of Uganda hold at least 51% of the beneficial ownership
Size area	• Not to exceed the prescribed area (see sizes by type of deposits and minerals below)
Exclusivity	• Yes
Duration/renewal	• Not exceeding two years • May be renewed for further periods not exceeding two years at a time
Transfer/upgrade	• Yes

The current attributes of a location licence bring very precarious rights for ASM operations, particularly those related to expenditure limits and mining area size. These restrictions undermine other important rights, such as exclusivity, transfer, and upgrade. The purpose of attribution of these rights is to incentivise small but progressive investments, which promote the growth and improvement of the mining operations. However, the location licence limits these objectives through its very restrictive concept of what ASM operations must involve.

Only One Licence to Cover All Different Sizes of ASM Operations

One generic observation is that the Mining Act only considers one licence for ASM operations. Consequently, ASM operations only have one option for a licence. The intent behind the location licence is to give a mining licence to artisanal mining (AM) operations. The concept of an artisanal operation appears to be linked to family operations or very small extraction sites because the expenditures allowed for bringing the mine into production are around USD 3,000.

Consequently, the small-scale operations that need more than the above amount of investment to bring the mine in production must apply for a mining lease. Requirements for this are in line with LSM standards, including a feasibility study, a detailed and costed Mine Development Plan, and a full EIA. Application, compliance, monitoring, and reporting requirements, such as annual environmental audits and detailed quarterly and annual reports, are also in line with the requirements for LSM. Meeting these administrative and technical demands prove challenging for ASM operations to legalise their activities. One way to overcome the limitations of the location licence to accommodate small-scale operation sizes could be to use the concept of amalgamating location licences. This means that several adjacent location licences could be combined, although the legal basis for this practice is unclear in terms of total expenditure, area permitted, duration, and the renewal process.

[58] It is important to note that, according to government officials, legislation planned under the NMMPU is expected to create separate licence categories for artisanal, small-scale, medium-scale, and large-scale mining, with much different licencing conditions than the current system (tenure, area, investment thresholds, etc.). Without anticipating the outcome of legislative and regulative processes, there exists a certain likelihood that many of the issues identified have also been identified by the GOU and will be addressed.

[59] Republic of Uganda 2004, The Mining Regulations. Statutory A Instruments 2004 n.71. Statutory Instruments Supplement; The Uganda Gazette No. 57 Volume XCVII. 5th November 2004; Republic of Uganda 2003, The Mining Act.

Mining Rights Granted

The attribution of prospecting rights as part of the rights granted by the location licence is very important because it recognises one of the most important differences between ASM and large-scale mining.[60] However, it appears that the mining regulation does not have a very clear understanding of the difference, given that one of the criteria for the amalgamation of location licences is to complete prospecting activities on all the location licence areas.

Size Area

The mining regulations define a maximum area to be attributed by the location licence, based on the type of deposit and minerals. These are categorised by classes:

- Class I - Lode locations for precious metals, 500 m in length along the supposed strike of the reef and 300 m in width
- Class II - Precious stone locations other than alluvial, 16 ha
- Class III - Locations for non-precious minerals, 16 ha
- Class IV - Alluvial locations for precious metals or precious stones, 16 ha
- Class V - Locations within a river or a swamp and land adjoining such river or swamp, 1,500 m measured along the middle of the course of the river or swamp and not more than 100 m on each side of the course of the river or swamp
- Class VI - Locations for limestone and chalk, 8 ha
- Class VII - Locations for brine and salt, 35 m in length and 10 m in width

These areas are very small, even for AM. Hinton (2012) agrees, describing the practical implications for artisanal operations:

> A Class I licence for precious metals in hard rock deposits covers an area of 500 m by 300 m and a Class IV licence for precious metals in alluvial deposits covers up to 16 ha. Many alluvial artisanal and small-scale gold mining activities are distributed across areas well more than 16 ha and/or work small deposits and move on to another site within the course of a few months or a year. Furthermore, those few hard rock deposits that are being worked involve several veins or shear zones that extend outside of a 500 m by 300 m area. Thus, even if artisanal and small-scale miners obtained a Location Licence for their activities, several adjacent licences would need to be obtained progressively to maintain legal status.

The mining regulations allow for the amalgamation of location licences under several conditions and justifications. It is a complex and unclear process that is difficult to meet, particularly given various unnecessary costs. This is further constrained because ASM is typically competing for access to land with other potential mineral rights holders[61].

Duration and Renewal of Location Licence

The licence duration of two years with the possibility of renewal for the same length of time is too brief and causes unnecessary restrictions and costs. The costs of submitting the application and administrative processes are impediments.

Transfer and Upgrade of the Location Licence

It is important that the attribution of these rights protect investment and allow a licence to be used as an asset for loans or access to credit. Nevertheless, the right to transfer or upgrade a location licence has limited value because restrictions on investment (less than USD 3,000) provide an inadequate basis on which to obtain a loan or micro-loan. The same situation occurs with the upgrading right because, in practical terms, it is difficult to impossible to upgrade from a location licence to mining lease. Simply put, **it is too demanding for an ASM operation investing less than USD 3,000 to upgrade to a licencing category that also serves those investing USD 100,000 or USD 100 million**.

[60] Industrial LSM must hold an exploration licence in advance of applying for the rights of extraction under a mining lease.
[61] MEMD 2009

2.2.5. Requirements of the Location Licence

In general, requirements for a specific mining licence should be suited to the type of mining operations it is meant to regulate. As discussed, the current location licence seeks to provide a mechanism to legalise AM and not small-scale mining (SM), given the USD 3,000 investment limit; therefore, some requirements outlined in Table 2 may pose some difficulty for many artisanal miners. The challenging requirements include:

- A statement about the nature of the mining operations proposed and the capital and experience available to the applicant
- Effective rehabilitation and reclamation of the mined areas
- Maintenance of accurate records

In addition to the location licence, the holder needs to obtain a separate permit for water extraction and discharge from the MWE.

Table 2: Attribution and maintain requirements of the location licence[62]

Requirements of the Licence	Additional Requirements to Maintain the Licence
An application with the following information: • The full name of the applicant • In the case of a partnership or other association of persons, the full names and nationalities of a partnership or association • In the case of a body corporate, the registered name of such body corporate and particulars of its shareholders, if any • Identify the mineral in respect of which the licence is sought • Identify the area in respect of which the licence is sought • A statement giving particulars of the nature of the mining operations proposed to be carried out and attesting to the capital and experience available to the applicant to conduct prospecting and mining operations of the mineral efficiently and effectively • Any other matter that the applicant wishes the Commissioner to consider or responding to the information the Commissioner requests	• Within the limits of the holder competence and resources carry on, in good faith, in the licensed area prospecting and mining operations • Furnish the Commissioner with such information relating to these operations as the Commissioner may reasonably require • Any directives relating to prospecting or mining operations that may be given by the Commissioner or an authorised officer for the purpose of safety or good mining practices • Keep accurate records of the minerals and mineral products obtained or mined; and such records shall be produced for inspection every calendar month and whenever demanded by the Commissioner or an authorised officer • Carry out rehabilitation and reclamation of mined areas • Submit to the nearest office of the Commissioner monthly returns of the operations • Compensation to the land owner or occupier for any disturbance of the rights and any damage to the land or property • Permit for water extraction and discharge from the MWE • Annual mineral rent • Payment of a royalty

Given the common constraints in terms of literacy, educational status, and financial resources, among others, the ability to comply with such requirements clearly depends on the availability of support or capacity building for artisanal operations. Women, who can comprise a substantial proportion of the AM workforce, are typically even more disadvantaged in these areas and can face additional obstacles related to autonomy, mobility, socio-cultural norms, and other aspects.[63]

The holder of the location licence also needs to pay royalty based on the minerals production. Under current legislation, different minerals apply different royalty rates:

- Precious metals: 3% of the gross value
- Precious stones: 5% of the gross value
- Base metals and ores: 3% of the gross value
- Coal: UGX 3,000 or USD 0.80 per tonne

[62] Republic of Uganda 2004, The Mining Regulations. Statutory A Instruments 2004 n.71. Statutory Instruments Supplement; The Uganda Gazette No. 57 Volume XCVII. 5th November 2004; Republic of Uganda 2003, The Mining Act. No. 9 of 2003.
[63] Hinton 2016

- Peat: UGX 500 or USD 0.15 per tonne
- Kaolin, limestone, chalk, gypsum, or vermiculite: UGX 3,000 or USD 0.80 per tonne
- Marble, granite, and other dimension stones: UGX 3,000 or USD 0.80 per tonne
- Pozzolanic materials: UGX 500 or USD 0.15 per tonne
- Phosphates: UGX 3,000 or USD 0.80 per tonne
- Salt: UGX 500 or USD 0.15 per tonne

The regulations do not distinguish the rate of the royalties based on the type of licence, meaning that **artisanal miners, despite their comparably limited financial resources, pay the same royalty rate as LSM operations**. This approach is problematic because it represents a cost that most ASM operations cannot afford. Furthermore, in contrast to global trends in ASM regulatory frameworks, it does not distinguish between royalty rates based on the type of licence and the dimensions of the operation[64]. Thus, distinctions should not only be between LSM titles/operations and ASM titles, but also between AM and SSM operations. It is worth noting that the DGSM has recognised bureaucratic and financial difficulties faced by artisanal and small-scale miners in paying royalties; thus, the practice has been introduced to require traders and exporters to pay the royalty on their behalf (for gold and 3T) as an interim solution prior to planned reforms. This solution does not protect the miners because the amount of the royalty paid by the exporter is deducted throughout the upstream chain in the sales price transactions of the gold, which directly affects the miners' earnings.

Mineral rent requirements also do distinguish between different licences. Each location licence requires payment of the equivalent of 10 currency points per annum (UGX 200,000 or approximately USD 58)[65]. Annual mineral rent requirements for a mining lease and exploration licence are based on the size of the area.

Based on this analysis, it is unclear **why one would invest in obtaining a licence that gives the holder very few rights and creates so many barriers to growing or improving the mining operations**. Legalisation for AM operations becomes a liability without any tangible gain.

These challenges are well described in Hinton et al. (2011)'s assessment in Karamoja, Uganda:

> Most artisanal miners have little if any awareness of legislation and, even if aware and interested to obtain a License, procedures are daunting to most. Most obvious constraints relate to costs, language (all documents are in English), illiteracy, licensing costs, transportation, accommodation and unforeseen, unofficial facilitation costs as well as the potentially intimidating experience of navigating the bureaucratic channels of Central Government.

3. Case Studies

Field assessments were conducted on two commodities and in two regions that reflect the diversity of Uganda's ASM sector and provide insight into their economic contributions. To cover the spectrum of different ASM setups, **gold** was selected as the typical high value/low volume ASM commodity, produced for export, and **clay** as a frequently overlooked but highly significant low value/high volume mineral resource produced for local domestic consumption.

For gold, synergies of research outcomes with DFID's progmatic priorities in Uganda led the researchers to prioritise an assessment of poverty-driven ASM in **Karamoja**, a high vulnerability context[66]. For clay, the most relevant case study sites are in the **Kampala/Entebbe** area, which has a high demand for construction materials and hosts many clay and clay brick production sites[67].

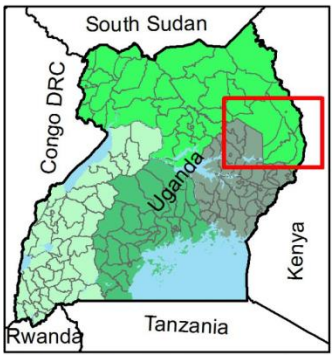
This section summarises these case studies. Detailed case studies are presented in Annexes 3 and 4.

[64] Otto et al. 2006
[65] The exception is the class VII, for brine and salt, that pays one quarter (0.25) of a currency point per year.
[66] Therefore, main gold production sites in Uganda were not assessed. The assessment included the more opportunity-driven gold rush situations found in Mubende, Bugiri, Busia, and, most recently, in Bushenyi Districts.
[67] Kampala is ranked 13 of the world's fastest growing cities, with an annual growth rate of over 4%., rapidly approaching a population of 2 million. (City Mayors 2016)

3.1. Case Study: Gold in the Karamoja Region

The Karamoja Region, located in the north-eastern corner of Uganda, boasts occurrences of over 50 different minerals that have prompted an influx of multiple companies over the past two decades, most of which have focused on exploitation of gold, limestone, and marble[68].

Figure 4: Study area Karamoja gold



Despite this plethora of mining, **the region continues to be one of the most underdeveloped in the country**, much of which is linked to extended droughts and flooding periods, causing widespread food insecurity, inadequate social services, and poor infrastructure coverage (roads, schools, hospitals), and to cattle-rustling-associated conflict, among others[69]. In periods of extreme food scarcity, according to one local government officer, 'poverty and food insecurity is so severe that, in many households, only two meals are eaten per week'[70].

In response to conflict, climate, economic, and land related pressures, thousands of Karamojong men, women, and children have abandoned their traditional agro-pastoral livelihoods to engage in ASM, with employment estimated at 18,000 in 2008[71] and 22,500 today.

Figure 5: Karamoja (left) landscape, (right) group of miners

The Rupa gold mining area is located approximately 10 km north of Moroto Town in Moroto District, and Morita is approximately 80 km south of Moroto in Nakapiripirit District (Figure 15 in Annex 3). In addition to field research in these sites, this analysis draws from numerous studies carried out in Karamoja[72].

3.1.1. Supply Chain Actors, Activities, and Employment

Main Supply Chain Actors

The supply chain is quite short and influenced by geographical characteristics. Moroto is less than 20 km from the Kenyan border, where gold mining is reported in Lokiriama (Turkana district), 44 km from Moroto. Moroto is also far (500 km) from Uganda's gold trading capital, Kampala. The geographical proximity to Kenya implies that gold should be sold in Kenya. However, since 2013, when Kenya cancelled export licences for gold, a considerable proportion of Karamoja gold is believed to end up in Kampala's informal gold market. Nevertheless, given the proximity to the Kenyan border and routes to Nairobi, a proportion of gold is likely smuggled there, particularly from Amudat and Nakapirpirit Districts. Also, given the proximity to Ethiopia, where gold is purchased at international prices by the national bank, a proportion is likely also smuggled into this more lucrative market.

The supply chain is typical for subsistence gold mining. **Miners** usually work in family units or in village groups. **Mine site buyers** buy the gold on-site, or in the case of scattered mining, usually in local

[68] Hinton et al. 2011 *[P; OBS, baseline]*
[69] Ibid
[70] Ibid
[71] MEMD 2009
[72] Hinton et al. 2011 *[P; OBS, baseline]*; Delany 2011; Ngabiirwe et al. 2012; Kabiswa et al. 2014; Houdet et al. 2014; ECO 2014; ECO n.d.; Burnett & Evans 2014; Alyebu et al. 2015

markets where foodstuffs and livestock are also traded. Mine site traders can act independently or as representatives of district or national traders. **Regional traders** usually purchase gold in the capital cities or send buyers to the mine sites or local markets. **Kampala traders** aggregate the gold in the capital and sell it to refiners who physically export the gold, typically to the United Arab Emirates (UAE). Some Kampala traders may aggregate Karamoja gold with that from other localities and refine it to 99.9% at the African Gold Refinery (AGR) in Entebbe prior to export via the nearby international airport.

Mineral Production Methods, Employment, and the Gender Division of Labour

There are two types of production systems in Karamoja:

- **Alluvial gold production**, wherein gold is 'free' within weathered or eroded soils
- **Hard rock gold production**, where gold occurs in veins of rock (quartz) that must be crushed and pulverised to free the gold

These systems differ in terms of the methods used, organisation and the gender division of labour, nature and severity of occupational and environmental risks, and other factors. The production process is summarised below and detailed in Annex 3 for alluvial gold production in Rupa and hard rock gold production in Morita.

For ASM in Rupa, as in most ASM sites across the region, the process basically involves:

- **Extraction** done by digging relatively shallow pits (approximately 2–5 m) using simple tools (pry bars, spades, pieces of wood) in relatively soft soils until a gravel layer is found. If visible gold is found in a sample of the gravel layer, this ore is progressively dug out and followed laterally using tunnels, in some cases for distances up to 50 m. This activity is done mainly by men and sometimes women.
- **Hauling** of ore to panning areas is done using basins, often by young boys and mainly girls. Both women and girls haul water used for panning in jerry-cans, sometimes over distances of 3 km or more.
- **Panning** is done mainly by women using basins, often in small holes dug in the ground to enable reuse of the water.

For ASM in Morita, as well as in Acherer (Tapac), Karita (Amudat), and previously in Lopedo (Kaabong), mining had been largely halted for three months due to flooding of underground shafts and tunnels and lack of water pumps. When in production, the main steps involve:

- **Extraction**, which involves breaking and digging in rock by men using pickaxes and sledgehammers. Shafts can extend to depths of up to 15 m until gold-bearing veins of rock (ore) are found.
- **Grinding** (pulverisation to the size of fine sand or flour) of ore is done mainly by women using grinding stones, who may be paid or perform the service for free, if a spouse of the miner providing the ore.
- **Panning** in basins is typically done by a team member (a man or woman) or wife of one of the men miners and seems to be largely unpaid. A panner can wash four basins of pulverised ore within a period of 1–1.5 hours.

Figure 6: (left) Mineral extraction, (right) ore grinding

When in full production, Morita miners work one of three eight-hour shifts per day, with a two hour of break spread over each shift. This contrasts with Rupa, where a typical workday is from 7 am to 2 pm.

Karamoja Region experienced a growing ASGM workforce, from approximately 15,000 in 2008 to 18,000 in 2011[73]. Current estimates provided by local stakeholders suggest the number may be closer to **22,500 men, women, and children** across the region. This is conservative given that, particularly in Moroto and Kaabong Districts, local leaders report that *all* residents of many sub-counties, from teachers to farmers to shopkeepers, abandon their daily work in the rainy season to pan for gold in rivers[74].

Environmental and Occupational Aspects

For both Rupa and Morita, production rates and **occupational and environmental risks are directly tied to conditions of water over-abundance or scarcity**. Many miners are desperate and take undue risks, a situation exacerbated by inadequate knowledge, skills, and resources. These issues are detailed in Annex 3, with key risks including:

- In Rupa, **miners work in un-supported tunnels** 2–5 m below ground, dug in relatively soft soils. Risk of collapse is greatest in the rainy season, ironically the time when much-needed water for panning is available. A fatality rate of 8% per year is crudely estimated based on the frequency of related deaths in recent years, as reported by miners.
- In Morita, because miners are digging in hard rock, tunnels and shafts are generally more stable, at least until the much desired, gold-bearing quartz veins are encountered. In this zone, the rock is highly fractured and more prone to collapse, but **timbers are generally only used to stabilise tunnels at the shaft opening**. Gold ore zones also are prone to a rapid influx of groundwater and can halt production entirely. Furthermore, **inhalation of silica-rich dust** while breaking rock underground and during grinding poses great risk for development of silicosis.
- Particularly in the dry season, **risks of heat exhaustion and severe dehydration are high**. Therefore, most workdays in Rupa typically commence at 7 am and end at 2 pm, while in Morita, miners work six hours over an eight hour shift.

- Main environmental concerns relate to **large numbers of abandoned pits** across ASM areas, which can pose significant risks for livestock and people walking around the area.

Figure 7: Gold buyer's scale

In the family-unit and subsistence-driven alluvial ASM scenario found in Rupa and other sites across Karamoja, **rates of child labour are high** (an estimated 20–30% of the workforce) and appear to be even more pronounced for girls than boys. Hard rock ASM requires a financed, small enterprise type of set up, as found in Morita, and can yield considerably higher incomes. In this case, participation of children appears to be much lower, although this is not certain. In both scenarios, **boys and girls engaged in ASM work are more vulnerable to occupational risks**, according to their different stages of development and, in some cases, gender. Additionally, children face a host of psycho-social impacts that can impair their development, including the denial of their right to education.

3.1.2. Distribution of Economic Costs and Benefits across the Supply Chain

Production Value and Sales

Most miners in Karamoja extract alluvial gold. Productivity on a per miner basis, as found Rupa, is extremely low (estimated at 0.12 g per day per miner). Production is significantly reduced in the dry season due to the lack of water for panning. Thus, dry and wet season variations of 0.1–0.3 g per person per day are estimated.

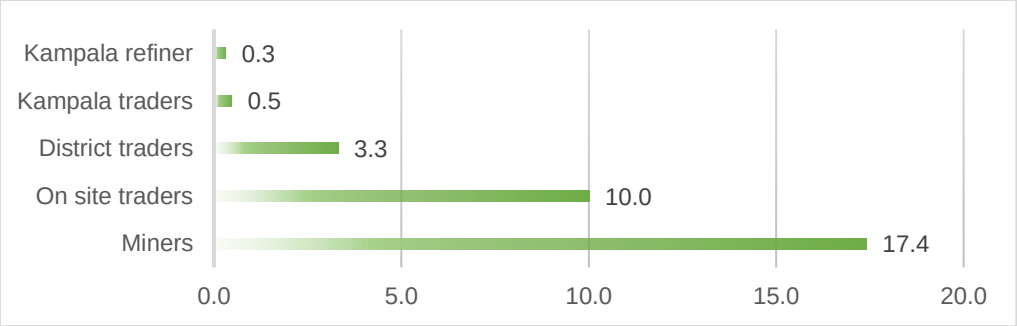
[73] MEMD 2009, Hinton et al. 2011 *[P; OBS, baseline]*, ECO n.d.
[74] Hinton et al. 2011 *[P; OBS, baseline]*

Despite this, due to high number of miners in the region, cumulative production is significant. Gold production in Karamoja is conservatively estimated at 845 kg per year, representing a London Bullion Market Association (LBMA) market value of USD 36 million[75].

Distribution of Revenues

On-site buyers were found to mislead sellers by adulterating the scales used to weigh the gold. Consequently, miners were found to sell at only approximately 55% of the LBMA gold price (Figure 8), well below the rate reportedly paid at other Ugandan sites. Therefore, of the total gold sales, only about USD 17 million is retained by miners in the region. For the gold mining workforce of 22,500, this represents an annual income of USD 770 per miner, which is 15% higher than the national GNI per capita of USD 670.

Figure 8: Revenue distribution of ASGM stakeholder in Karamoja (in USD millions based on 2015 LBMA average gold price)



Gender Distribution of Benefits

Given levels of extreme poverty and food insecurity coupled with environmental and climate conditions constraining agricultural livelihoods, **ASM draws entire families into the sector**. This is particularly true for clans that have lost most or all of their livestock due to cattle rustling, a practice that has seen some decline in recent years. Given the economic benefits of ASM, many men and women miners have been able to reacquire livestock, and many contend that they would prefer to engage in both ASM and their traditional agro-pastoral livelihoods.

Polygamy is common practice in Karamoja, which, combined with conditions described above, accounts for **women's and girls' high rates of participation, approximately 40–80% in most alluvial areas**. Conversely, women comprise a smaller proportion of the workforce in hard rock gold mines (approximately 30–40%), as found at Morita, due mainly to the organisation and financing structure of work and nature of working conditions.

The capacity for women to control and make decisions concerning use of earnings seems to vary widely. In some cases, women turn gold over to their spouses, who sell and make final decisions concerning the use of the proceeds. In other situations, as in Morita, women are paid by miners for grinding, panning, or cooking services, *except* when these activities are performed for their husbands.

Figure 9: Karamoja Women Miners

Aside from agro-pastoral livelihoods and ASM, the next most lucrative economic activity seems to be production and sale of local sorghum-based alcohol, which provides a source of income, mainly for women. **Alcohol abuse is pervasive across Karamoja and ASM areas**; with it comes a range of other social ills that can disparately

[75] Production estimates are based on current estimated number of miners (22,500) and calculated annual individual production as observed in Rupa, accounting for seasonal variations and purity. Value of this gold based on September 2016 average LBMA price.

impact women and girls. These include sexual and gender-based violence (SGBV) and, particularly in rush scenarios, growth of the sex trade and escalation of HIV/AIDS and other sexually transmitted infections (STIs), such as syphilis[76].

3.2. Case Study: Clay and Brickworks in Greater Kampala

This section provides a summary of the field research in clay and brickworks sites in the wider Kampala area. A detailed case study is provided in Annex 4. The researchers assessed a variety of mine sites in Wamala Subcounty in Wakiso District and Nakisunga Subcounty in Mukono District. However, as substantiated by earlier assessments across the country, the findings below are believed to reflect many of the economic, technical, environmental, occupational, and social conditions encountered at sites around the country[77].

3.2.1. Supply Chain Actors, Activities, and Employment

Many commercial ASM clay operations in Uganda use ball clays—highly plastic, easily mouldable, and readily available in wetlands across Uganda—to produce solid bricks for construction. Other clay products, such as clay stoves, pots, roofing tiles, and drainage pipes, are produced[78], but are much less commercially significant and thus excluded from the assessment.

Figure 10: Study area Kampala clay

Primary Supply Chain Actors

The artisanal brick supply chain is typically direct and short. Bricks are usually fabricated and sold directly at the clay extraction site. In some cases (and for *other* brick products), sales take place in nearby shops in village trading centres. **But for solid bricks, extraction, processing, and commercialisation are carried out at the same location**.

Three types of actors constitute the supply chain.

- On one side is the **land owner**, who is either paid an annual fixed sum by pit owners or sells a plot of land. In both cases, she/he also receives a royalty per fabricated brick.
- The second stakeholder group is the **pit owner** or team leader. This group is made up of the entrepreneurs who invest in the acquisition of the plot for clay extraction or pay an annual rent to the landowners. The pit owner also pays the salaries of the workers and finances the fabrication and marketing cycle of the bricks.
- The last stakeholder is the **miner** working for the pit owners/team leaders.

Mineral Production Methods, Employment, and the Gender Division of Labour

The system of production in a typical clay extraction and brick production site involves:

- **Extraction and preparation:** Following the clearing of vegetation and topsoil, shallow pits are dug into thick clay layers using spades and hoes and clay is hauled using buckets and basins, piled adjacent to pits, and covered with grasses for up to two weeks. After this, water is added to the mound, mixed and compacted by foot, and left to rest for another three days.
- **Moulding:** Water is added to clay, worked with a hoe, then pressed firmly into a wooden mould. An average moulder can produce 200–300 of these green bricks in a single day.
- **Drying:** Bricks are placed in a drying area and covered with grasses for two to three days, then stacked up to 2–3 m high and covered again with grasses until dry or stored until wood is purchased.
- **Kiln construction, burning, and cooling:** A stack of 5,000–15,000 dry bricks can range in size from 2–5 m by 2–5 m and 3–4 m high. Depending on the kiln size, each kiln is equipped with two to five heating gates where fuel wood is placed. At some sites, exterior kiln walls are plastered with clay and green bricks to retain heat internally and grasses are placed across the top to protect from rainfall. Dry wood is placed in the gates, ignited and kept burning for two to six days before

[76] Hinton et al. 2011 *[P; OBS, baseline]*
[77] Some economic and organisational differences are anticipated between commercial, solid brick production characterised herein and solid bricks made from clay-rich soils (murram) producing extremely low quality, low value bricks used to construct basic homes for the most economically disadvantaged Ugandans.
[78] Hinton et al. 2008

gates are sealed with bricks and the pile is left to cool. Kiln piles are typically deconstructed as lorries arrive to purchase them.

Figure 11: (left) Clay extraction, (right) Brick kiln

Depending mainly on weather conditions and the expertise of the workforce affecting time frames applied, the entire production process typically takes five to nine weeks. Work mainly is carried out by teams of three to eight people, who either share the proceeds from the work, following deductions for costs and greater share given to the team leader who provides financing, or, more commonly, miners are paid approximately UGX 1,000 or USD 0.25 per day by team leaders, who finance activities. Though both women and men carry out all activities, **women are engaged less frequently** in kiln construction and de-construction and participate at much lower rates overall (approximately 10–15%)[79].

The National Strategy for ASM estimated that, in 2008, 45,556 clay miners annually produced 4.05 billion bricks[80]. Extrapolated at the same rate as the UBOS Construction Sector Index, it is estimated that the brick sector today **employs approximately 93,000 miners, producing an estimated eight billion bricks**[81].

Environmental and Occupational Aspects

The main environmental impacts relate to **wetland destruction** and **deforestation**. Based on production levels and footprint created by the ASM operations visited, as well as national production estimates, **up to 10.1 km^2 of mainly wetland resources may be degraded annually in Uganda**.

Figure 12: Firewood for brick production

Wood is used to burn approximately 91% of bricks in Uganda[82], amounting to **approximately 6.7 million tonnes of forest resources consumed annually**[83], potentially impacting as much as 398 km^2 per year of forests from which it was sourced[84]. According to

[79] MEMD 2009

[80] Estimates in MEMD (2009) were stated as being conservative as they were interpolated from demand for bricks only for (reasonably well quantified) housing construction rates and excluded uses (other types of buildings and other products, e.g., clay stoves). Furthermore, official brick production by companies was deducted from brick consumption and demand for housing.

[81] The technology, methods and organisation of labour have largely gone unchanged since the 2008 estimates. Thus, the production rate per miner is also likely to have unchanged. Based on this, combined with 2008 employment estimates and market growth as illustrated by the Construction Sector Index, current employment numbers were extrapolated. Additional details can be found in the full case study in Annex 4.

[82] World Bank & UNDP 1989

[83] By comparison, the construction sector consumed 34.4 million tonnes of round wood in their work in 2008. (Kaboggoza 2011)

[84] Calculated from 2015 estimates for sawn timber demand (607,000 m^3 with an area equivalent of 5,365 ha in using a eucalyptus density of 0.56 g/cm^3). Kaboggoza 2011

several miners interviewed, wood most commonly originates from forests adjacent to production sites, thus further increasing the strains on the natural environment of massive population growth around Kampala and other urban centres.

The primary occupational issues relate to heat stress; injuries to the lower and upper body, limbs, and spine caused by repetitive motion and incorrect methods of lifting and carrying; and risks from prolonged and repeated water immersion. Mine workers commonly **lack any form of personal protective equipment** (PPE). In addition, because most clay production takes place in wetlands prone to flooding, risks are also associated with malaria and humans and animals falling into pits, posing risks of injury or drowning.

Few children were observed directly engaged in work, the exception being younger boys of about 12–14 years of age. Nevertheless, children's participation in brick-making has been identified as a **major source of child labour** in the National Action Plan on Elimination of Worst Forms of Child Labour in Uganda (2012).

3.2.2. Distribution of Economic Costs and Benefits across the Supply Chain

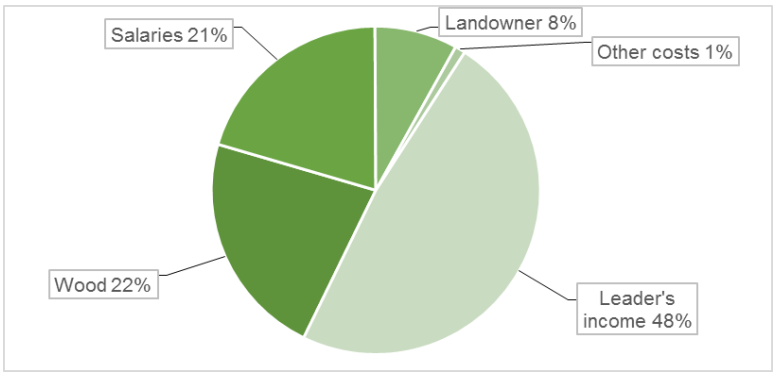
Production Value and Sales

In 2008, approximately 4.05 billion artisanally and small-scaled mined bricks were sold at UGX 150 or USD 0.40 per piece, generating an annual turnover of UGX 608 billion (approximately USD 317 million at 2008/9 rates)[85]. Extrapolation of this by the rate of increase of the construction sector GDP (from UGX 1.8 billion or USD 500,000 to UGX 6.16 billion or USD 1.7 million between 2008 and 2016), **the current production value is estimated at UGX 1.7 trillion (USD 499 million) or 1.9% of the 2015 GDP**[86].

Distribution of Revenues

The distribution of revenues from ASM clay mining and brick production is shown in Figure 13.

Figure 13: ASM of bricks, revenue distribution



Although artisanal and small-scale brick production belongs entirely to the informal sector and is not regulated under the current mining legislation, local governments are believed to capture some revenue in the form of taxes, fees, and levies that reportedly vary between local authorities. Among these, sites assessed a levy of UGX 15,000 or USD 4 per day paid for trucks transporting bricks. Because this amounts to less than 1 shilling per brick, it is an insignificant amount.

Indirect government revenues through VAT generation need to be considered. If only one third of salaries and 20% of the owner's income was to be spent on VAT-taxed goods, this would imply that 3% of this sales end in the state VAT-collected budget. Based on these assumptions and estimated sector sales, **VAT contributions are estimated at USD 15 million per year**.

[85] MEMD 2009

[86] As discussed in section 4.1.2, this estimate may be conservative given that original estimates, from which they were extrapolated, were only focused on demand and consumption for housing construction (deducting official production by companies) and therefore excluding other types of structures (e.g., shops, lodges) and products (e.g., clay stoves, pots).

Gender Distribution of Benefits

Women have lower participation levels than men (approximately 15%) and are less likely to have the financial resources needed to take on lucrative jobs as team leaders (approximately 10% women). Furthermore, women's ownership of and control over proceeds derived from land are low (precluding income earning via rent)[87]. Furthermore, women's ownership of lorries and engagement in the wood trade is extremely uncommon. Given this and the distribution of revenues above, in terms of direct employment and economic benefits, **women may hold 15% of the jobs in clay brick production, but are estimated to yield only approximately 8% of the economic benefits from the sector**.

Although indirect employment through injection of revenues into local economies can be significant, the solid brick supply chain is short. **Local economic and employment multiplier effects could be enhanced through an emphasis on other products** that are more commonly sold in local shops, such as ventilation and facing bricks, clay pots, and clay stoves. Despite this, the relative demand, production volume, and value are far below that of solid bricks. Nevertheless, women's participation in production and sales of these other products is believed to be much higher than that of solid bricks, potentially providing an area of focus for women's economic empowerment.

4. Micro- and Macro-Economic Contributions

4.1. National Economic Development

4.1.1. Foreign Exchange Earnings

Gold is the main mineral commodity produced for export in Uganda. Official gold export figures massively dropped from 6.9 tonnes in 2006 to 161 kg in 2013 and to around 15 kg in 2014 and 2015. This decline started in 2007, when the UN Security Council imposed sanctions on Ugandan gold traders for buying gold from the DRC that was tightly linked to militias[88]. Nevertheless, import and export statistics are virtually unrelated to in-country production figures. This is mainly due to volatile cross-border trade between neighbouring countries[89] and royalty rates (5%) in Uganda imposed on internal production (paid by exporters for ASGM) exceeding the duties on imported gold (1.5%).

Uganda's ASGM production was conservatively estimated in 2008 at 1.2 tonnes, equivalent to approximately USD 28 million[90]. This production was entirely attributed to informal ASM, with official production statistics citing only 0.012 tonnes in 2008. Currently, gold production in Karamoja alone is believed to amount to 845 kg. Given the large number of hard rock gold rushes across the country (some of which reportedly produce 3–5 kg per week or more) in addition to other more permanent ASGM sites, the total ASGM production has been estimated to **nationally amount to 2 tonnes per year** by Kampala traders[91], although other estimates even tend towards 2.8 tonnes in 2016[92]. Based on these estimates, Karamoja gold would constitute approximately 42% of the country's ASGM production.

Therefore, the foreign exchange earning potential is high, with 2 tonnes corresponding to a **value of USD 85 million**[93]. Upon comparison with official gold export statistics, Ugandan ASGM would account for 42% of gold exported (valued at approximately USD 204 million) in the 2015/16 fiscal year (FY)[94]. Furthermore, Uganda's overall trade deficit (USD 1.87 billion in FY 2015/16) **would have been 5% higher in the absence of ASGM**.

[87] Only approximately 25–30% of land in Uganda is titled, of which women hold only 6% of titles. Under mailo or customary land ownership, unless women are household heads, they are likely to have much less control over proceeds derived from land than men household heads. Ellis et al. 2005
[88] GOE 2006; GOE 2014, p. 24; Schipper et al. 2016
[89] ARM 2014; Blore 2015
[90] MEMD 2009
[91] According to Kampala's traders' interviews
[92] Schipper et al. 2016
[93] Based on LBMA price Sept. 2016
[94] BOU 2016a, p.163 (Table: Composition of Exports)

4.1.2. GDP Contribution

ASM continues to be mainly in the informal sector and is not accounted for in the country's GDP calculation. As estimated in section 0, the direct value generation of ASGM is in the range of USD 85 million and, as described in section 3.2.2, the value of ASM of bricks is on the order of USD 500 million[95]. This suggests that ASM of bricks could be almost 6 times more economically significant that ASGM. Of additional significance is that **these estimates suggest that if ASM of clay bricks and gold would be included in the formal sector, Uganda's GDP would increase by more than 2%**.

If other ASM commodities were included in these estimates, contributions could be substantially higher. According to the International Institute for Sustainable Development, despite growth in the mining sector, industrial LSM still accounts for a negligible portion of the national economy[96]. In 2008 and 2010, the formal mining sector accounted for just 0.3% and 0.5%, respectively, of Uganda's GDP and excluded ASM, which was estimated to account for approximately 90% of mineral production[97]. In 2008, ASM of 10 minerals (gold, tin, tantalum, tungsten, limestone/marble, stone aggregate, clay and clay bricks, sand, dimension stone, and salt) was estimated at a value of USD 632.4 billion. At the time, **ASM would have been equivalent to 3.5% of GDP, almost 12 times higher than that contributed by LSM**.

4.2. Local Economic Development

4.2.1. Employment

Ugandan unemployment rates are 9.4% (8% men; 11% women), while underemployment due to lack of skill, time, or income apply to an additional 27.4% of the working age population[98]. Of the working population, 72% are engaged in the agriculture sector[99], although Uganda Vision 2040 highlights non-agricultural job creation as a priority for the nation's development.

In 2008, employment in the ASM sector was assessed as part of the National ASM Strategy. At that time, the total number of artisanal and small-scale miners was conservatively estimated at 200,000 (Table 3)[100]. Based on gender division of labour for different sites and commodities (with highest participation rates in stone aggregate production), almost half of these miners are women.

Table 3: Formal and estimated informal employment in selected ASM segments in 2008[101]

Commodity	Western	Southwest	Central	Eastern	Karamoja	Northern	Total
Gold	1,200	250	100	450	15,000	-	**17,000**
Cassiterite	-	900	-	-	-	-	**900**
Coltan	-	200	-	-	-	-	**200**
Wolfram	-	600	-	-	-	-	**600**
Limestone/marble	100	-	-	600	3,000	200	**3,900**
Stone aggregate	7,900	11,850	60,193	29,156	100	6,688	**115,887**
Sand	303	455	2,311	1,120	50	361	**4600**
Clay	5,531	5,531	24,235	5,645	50	4,562	**45,554**
Dimension stone	237	237	1,444	699	-	226	**2,843**
Salt	7,200	-	-	-	-	-	**7,200**

[95] A production value of USD 499 million was extrapolated from 2008 production and value estimates by MEMD 2009, accounting for current brick sale prices and construction sector growth rates of 6% per year. Notably, the 2008 estimate was stated as being conservative, given that it is based on constructions rates of brick housing alone (excluding other types of structures and products, e.g., clay stoves) and deducting official brick production by companies.
[96] Crawford et al. 2015
[97] MEMD 2009; World Bank 2013
[98] UBOS 2015
[99] Ibid
[100] MEMD 2009
[101] Ibid

Commodity	Western	Southwest	Central	Eastern	Karamoja	Northern	Total
Total	**22,471**	**20,023**	**88,283**	**37,670**	**18,200**	**12,037**	**198,684**
Men	11,011	11,413	38,845	18,835	7,826	6,527	**101,329**
Women	11,460	8,610	49,438	18,835	10,374	5,510	**97,355**

For the **gold** sector, Hinton revised the total numbers from 17,000 to 'at least 20,000' (2012, p. 6). However, since 2013, Uganda has experienced several ASGM rushes mainly in the areas of Mubende, Mayuge, Namayingo, Bugiri, Busia, Karamoja, and, most recently, in Bushenyi. These gold rushes have attracted an influx of artisanal and small-scale miners from other districts and neighbouring countries, such as Tanzania, Burundi, and the DRC. In line with the 'cycle of discovery, migration and relative economic prosperity followed by resource depletion, outmigration and economic destitution', rush populations can fluctuate widely[102]. For instance, as many as 5,000 and 10,000 miners were active at the height of activities in rushes in Acherer in Tapac District and Rubaale in Mubende District, respectively. Workforce populations at those sites have since declined to a few hundred (Acherer) and a few thousand (Rubaale) because the easier to access, near-surface ore was depleted and miners migrated to new rushes. At present, the ASM population in the Karamoja Region is believed to have increased from 15,000 to 22,500.

Recently, some authors have estimated that as many as 50,000 women, men, and children are engaged in ASGM production[103]. The authors of this report consider these numbers inflated[104], but consider an **ASGM population of 40,000 miners** reasonable.

As shown in section 0, the number of artisanal and small-scale miners in clay brick production has sharply increased between 2008 and 2016, from 46,00 to **93,000**. Like clay bricks, other construction minerals (stone aggregate, sand, limestone, and lime) are mainly consumed to meet local market demands (e.g., house construction, small shops). The proportion of the construction sector associated with major infrastructure investments (hydropower plants, road works, large hotels, and housing estates) largely do not source from ASM. Thus, the population growth rate (rather than construction sector growth) provides a more reasonable basis to estimate changes in employment since 2008 for these construction minerals.

Based on this assumption and estimates for clay and gold provided herein, the current **ASM population is estimated at more than 300,000** women, men and children[105]. Based on women's high levels of production in certain key sites and minerals, they are currently estimated to comprise approximately 40% of the ASM workforce overall[106].

4.2.2. Indirect Employment and Economic Multiplier Effects

Given that most miners spend their incomes in local economies, the employment generation and stimulation of local economic development, including through support for micro- and small-enterprises, is likely to be significant. Using indirect employment multipliers of 2.5 previously applied in Uganda and elsewhere[107], **an estimated 750,000 Ugandans would benefit vis-à-vis additional jobs created by**

[102] Veiga & Hinton 2002
[103] Schipper et al. 2016
[104] Schipper et al. (2016) add the 15,000 Karamoja miners to the known numbers from 2008, while these were already accounted for (northeast area in Table 3).
[105] Gold: 40,000; 3T: 1,700, limestone: 5,000; stone aggregate: 150,000; sand: 6,000; clay: 93,000; dimension stone: 3,000; and salt: 7,000. Totalling 305,700. As other minerals were not assessed, estimates on 3T minerals and salt have not been updated from 2008 for total ASM employment estimates.
[106] Women participate in highest proportions in stone aggregate production and gold in Karamoja Region. Participation is lowest in tin, tantalum and tungsten (approximately 15–20%). MEMD 2009
[107] Drechsler 2001; MEMD 2009; Hinton & Levin 2010

the sector[108]. Together with direct work in ASM, this amounts to **a total estimate of 1,050,000 jobs produced by ASM**[109].

Based on an average household size of 4.7[110], approximately **5 million Ugandans, equating to approximately 10% of the population, are estimated to be directly or indirectly, wholly or partially economically reliant on ASM**.

5. Conclusions and Recommendations

With recognition of the substantial development potential and livelihood significance of ASM, numerous governments around the world are now acting to put in place and sustain commitments to advance formalisation of the sector. Formalisation goes well beyond granting legal status and collecting taxes to include multi-pronged and continuous efforts to address the technical, environmental, occupational, and social challenges and opportunities in ASM. Increasingly, these efforts are grounded in the principles of inclusivity, to bring about an increase in voice, participation and responsiveness to vulnerable groups, and equality, particularly with respect to how and to whom risks and benefits are distributed (i.e., between women and men, boys and girls).

This study informs formalisation efforts for ASM in Uganda by providing insight into the sector's economic contributions and by identifying critical issues requiring emphasis, including within policy and legal reform processes. The study identifies how the economic development potential of ASM can be realised as environmental, health, and social risks are mitigated. The conclusions and recommendations highlight the often-complex interaction of environmental, social, and economic dimensions that underpin both problems and solutions to the challenges faced by the ASM sector. Main conclusions and recommendations, some of which are commodity or region specific, are provided below.

5.1. Conclusions

5.1.1. Economic and Social Contribution

If ASM of clay bricks and gold were included in the formal sector, it is estimated that Uganda's GDP would increase by more than 2%. Although not captured in official, national statistics, results herein estimate the value of ASM of these minerals to be more than USD 585 million. Furthermore, given foreign exchange earnings from ASGM exports alone, without ASGM production, in 2016, Uganda's trade deficit would have been 5% higher and the overall trade deficit would have been double.

ASM produces a crucial source of much-needed employment and means to reduce rural-urban migration. Ugandan unemployment rates are 9.4% (8% men; 11% women), while underemployment due to lack of skills, time or income account for an additional 27.4% of the working age population[111]. Direct employment in ASM is estimated at approximately 300,000 jobs, including approximately 40,000 in gold and 93,000 jobs in clay brick production. Notably, the latter is mainly created in peri-urban areas where, in poor households, only 6.5% of the population is employed[112].

ASM is economically significant to an estimated 5 million Ugandans. Total direct jobs in ASM are estimated at 300,000 for all commodities (approximately 40% of which are women). Induced labour in the amount of an additional 750,000 jobs created through stimulation of local economies is estimated.

[108] This multiplier seems reasonable given a national GNI of USD 670 per person per year. Based *only* on the gold retained in Karamoja Region (estimated at USD 17 million) and clay and clay bricks (estimated at USD 500 million), expenditure of that capital in the economies is equivalent to the GNI contribution of 771,641 Ugandans. Furthermore, earlier multi-site, multi-commodity assessments indicate that ASM incomes are 6-20 times greater than those in other economic sectors in the same regions. MEMD 2009

[109] This 'rough' extrapolation has inherent uncertainty, particularly given the risk of 'double counting'. I.e., the case where multiple household members may participate in ASM or related spin-off activities.

[110] UBOS 2014

[111] UBOS 2015

[112] Ibid

Given this, coupled with a household size of 4.7 persons, ASM directly and indirectly benefits approximately 10% of Uganda's population.

ASM creates significant benefits to mining households and creates economic multiplier effects in communities around mines. This is mainly through expenditure of miners' incomes on school fees, health care, housing improvements, investment in agriculture and land, and day-to-day expenditures in nearby communities, catalysing micro- and small-enterprise development and related job creation. In the case of clay, this is estimated at approximately USD 500 million per year, while for gold in Karamoja, miners' incomes amount to approximately USD 17 million per year.

Challenges for Women and Other Vulnerable Groups

Despite these contributions, women realise fewer benefits from ASM than men, but bear the brunt of the consequences. For example, in clay brick production, women hold approximately 15% of the jobs, but obtain only 8% of the revenues. In Karamoja's gold production, women constitute 30–80% of the ASM workforce, but exert varying (sometimes little or no) influence on how proceeds are used. Despite this, women must maintain household food security and caregiving roles, including those related to water collection. Thus, environmental impacts on water sources and croplands and illnesses and injury of family members can have profound impacts on their already heavy work burdens, while impairing time and resources available for their economic empowerment.

Child labour is most pronounced in areas of extreme poverty and where ASM is less formalised. Child labour was found to be an issue in both brick-making around Kampala and gold production in Karamoja, although it is known also to exist in other regions and for other commodities (salt, stone aggregate, sand). Based on prior work in Uganda, rates of child labour tend to be higher in sites that are more informal and where participation is poverty- rather than enterprise-driven.

Technical, Safety, and Environmental Challenges

In the case of clay and clay brick production, impacts on wetland and forest resources are significant. Although this provides a critical and much-needed source of peri-urban employment, on an annual basis, it is estimated that clay brick productions annually results in degradation of up to 9 km^2 of land and consumption of approximately 6.7 million tonnes of wood resources, impacting approximately 398 km^2 per of forests from which it was sourced. Current methods lack suitable strategies for water and wetland management and are highly energy inefficient.

In the case of gold mining in Karamoja Region, occupational risks are severe and more pronounced for vulnerable children involved. Collapsing tunnels dug in loosely consolidated soils have caused a fatality rate of up to 7% per year. Additional issues include poor ventilation, flooding, and (in hard rock gold sites) dust exposure. In periods of water scarcity, heat exhaustion and severe dehydration coupled with food insecurity caused by low production rates pose significant concerns. Other health risks, such as alcohol abuse, SGBV, and transmission of HIV/AIDS and other STIs warrant additional attention. Children in ASM are highly susceptible to these risks, and child labour rates can be high (approximately 20–30% in some sites).

5.1.2. Formalisation Opportunities and Legal Challenges

The relatively low achievement of ASM legalisation thus far is due to a lack of attention to the formalisation process. Legalisation is only one dimension of formalisation. The current policy and legal framework recognises that ASM exists, and policy recommendations allude to actions to be taken by government (e.g., extension services, financing, organisational support). However, unless institutional commitments are implemented, progress toward formalisation will continue to be slow.

The relatively low achievement of ASM legalisation thus far is also due to deficiencies in the current legal framework. Legalisation of ASM operations can be achieved only with a legal framework that takes into consideration:

- The diversity of ASM operations
- Differences between ASM operations and large-scale operations (including in fiscal, environmental, and occupational provisions)
- Under-capitalisation of ASM and related cost constraints
- The need to promote ASM operations to grow and improve their activities with the aim of encouraging continued progress

Licencing and formalisation of ASM becomes even more complex when construction minerals are considered. Constitutional provisions concerning ASM of clay, sand, and stone aggregate have left this facet of the sector under the jurisdiction of multiple authorities. Consequently, and despite some efforts by the Directorate of the Geological Survey and Mines, multiple agencies play roles in authorising, regulating and taxing activities, yet the subsector remains largely neglected. Proposed mineral policy reforms indicate the intent to rectify this situation, although strategies to mitigate legal constraints and address inter-agency coordination are unclear[113].

Economic contributions of ASM provide a case for action that would be strengthened through robust data and formalised systems for its collection. Multiple studies have been conducted on ASM in Uganda in the past, yet these studies (including this assessment) provide only a snapshot of a place and time. This, together with lack of harmonisation in data collection and analytical approaches, provides an impediment to using research findings in monitoring policy and practice. In any event, this study demonstrates that ASM is a significant contributor to economic development, providing a basis to advocate for the inclusion of ASM in government surveys, statistics, and databases.

Promising shifts in political will and current policy and legal reform processes create an unparalleled opportunity to realise the development opportunities from the ASM sector. ASM is garnering recognition at the highest levels, as evidenced by the draft minerals policy. Nevertheless, multiple challenges exist in translating policy objectives into law and institutional action. Much emphasis continues to be placed on investment by larger sector actors who yield far more influence than artisanal and small-scale miners and increased and positive attention toward ASM has only been very recent.

5.2. Recommendations

5.2.1. Training to Support ASM Workers to Mine Safely and Responsibly

Conduct targeted campaigns to sensitise, train, and avail resources to ASM as the foundation for longer-term support. Ideally, this would be conducted together with government partners that are mandated to provide ongoing support to ASM. Topics should include:

- Appropriate, economically beneficial, occupationally safe, and environmentally responsible methods and techniques
- Basic business skills and financial literacy training alongside efforts to introduce mining desks in local banks and support establishment of savings and credit groups and societies
- Formation of gender-inclusive ASM organisations at local, regional, and national levels
- Environmental, occupational and social risk management
- Child labour, via inclusive and multi-pronged efforts in coordination with all actors (teachers, mothers, fathers, local leaders) and with an emphasis on women's empowerment
- Legal and regulatory requirements

Tailor training and outreach campaigns to the commodity, site, and target beneficiaries. This includes accounting for demographic characteristics (e.g., literacy, financial status, language) and technical aspects (e.g., current methods, water resources, environmental, occupational, and social risks) of target beneficiaries and sites. For example, the main *technical* training priorities identified in the case study sites include:

- **Clay brick production:** Energy efficient kiln construction (dimensions, shape, insulation, airflow, heat distribution), standardisation of production (e.g., brick size, clay selection, drying practices, duration of different production phases), biomass alternatives (e.g., wood fuel; bio residue mixing) and related environmental measures (e.g., converting depleted pits into fish farms, re-contouring, re-vegetation, water management, creation of wetland corridors)
- **Gold production in Karamoja Region[114]:** Increasing efficiency of methods and addressing water shortfalls (dry separators; centralised water resources e.g., side valley dams, reservoirs, tanks);

[113] The recently initiated ACP-EU Development Minerals Progme spearheaded by UNDP and, in Uganda, the GOU, is planned to make substantial contributions with ASM of construction, industrial, dimension stone, and semi-precious gemstones in the country.

[114] Gold in other major ASM areas (rushes in Mubende, Bugiri, Busia and Bushenyi) possess similar characteristics in terms of extraction and processing methods, environmental, occupational and social issues as

where water is available, basic sluicing technology would see significant production and income gains. Priorities also include occupational health risks (timbering, tunnel stability, dust mitigation, water management) and community health and child labour issues (alcohol abuse, SGBV, HIV/AIDS and other STIs).

Place a special emphasis on gender risks and opportunities in design and implementation. Whether activities concern introduction of mechanised methods, financing models, legal provisions, or training of mine leaders, if approaches are gender blind or neutral, they pose a risk of rendering much of women's work at mines obsolete and impeding women's advancement alongside men[115]. Actions needed include gender impact assessment of any proposed interventions; targeted, preferential training of women in all topics; and explicit efforts to counter discriminatory norms and beliefs and to challenge barriers to women attaining higher paying, more influential jobs.

5.2.2. Integrate Legalisation within Broader Formalisation Strategies

Strengthen formal, government commitments to holistic and gender responsive formalisation. This would include putting policy objectives concerning ASM formalisation into practice, in part by explicitly defining institutional mandates (including responsibilities for financing and monitoring implementation) within the upcoming law and regulations. This also includes greater emphasis on gender-responsive formalisation within future national development plans and within MEMD's and its collaborating authorities' annual work plans, budgets, and strategies. Ultimately, a comprehensive ASM strategy, ideally building upon the 2008/9 ASM Strategy as a starting point, is needed to identify and clarify goals and objectives, mandates, inter-agency coordination arrangements, activities, budgets, and financing commitments.

Integrate formalisation strategies within legalisation efforts. Important dimensions should include:

- **Capacity building of ASM operations** to support them to successfully obtain and maintain their legal status and to improve techniques, internal processes, and overall management
- **Promote the organisation of the miners in legal entities** to perform mining activities more efficiently and represent the interests of this sector at different levels of the country
- **Generate and provide access to information** about and for ASM sector with the objective of better understanding the sector and helping the sector to navigate within the formal economy
- **Create economic incentives to achieve formalisation** through access to credit and loans, access to better markets and fiscal regimes (fees, royalties and taxes) that are compatible with different sizes of ASM operations, and recognising under-capitalisation of most ASM operations
- **Create policies and programmes to empower the most vulnerable groups**, including women, to help them realise their full capacity and rectify inequalities in the distributions of impacts and benefits from the sector

Ensure that new legislation adequately accounts for current gaps and incorporates international good practice. Based on the analysis of the current legal framework and Uganda's ASM sector and informed by experiences around the world, the following is recommended.

- **Allow for at least two mining licences**, one for AM operations and another for SSM operations. Reportedly, this (in addition to separate medium- and large-scale mining licences), is planned in upcoming legislation.
- **The quality of mining titles should support stability, growth, and improvement of the operations**, with the following adjustments:
  - Appropriately sized areas: Consider attributing around 20–50 ha as the largest areas for AM licences and 200–1,000 ha for SSM.
  - Change licence duration to not less than 3 –5 years for AM and 5–10 years for SSM.
  - Enable the possibility to renew the licence until the exhaustion of the deposit.
  - Consider controlling the size of the operation through the amount of mineralised material extracted and not by levels of expenditures. For example: (i) artisanal operations up to 25 or 50 m^3 per day; (ii) alluvial mines and up to 5 or 10 tons per day for hard rock mines; (iii) SSM up to 500 m^3 per day and alluvial mines; and (iv) hard rock up to 100 ton per day.

found in the Migori Region. Useful recommendations can be found in the companion Kenya Case Study Report, as well as from earlier work in Uganda (e.g., Hinton et al. 2008, MEMD 2009).

[115] Hinton 2016

  - Attribute exclusivity, transferability, and upgrading rights for both types of ASM licences.
- **Simplify requirements for attribution, maintaining and renewal of licences.** Requirements should be more demanding for small-scale than for AM operations, while providing a reasonable opportunity to upgrade to the next category.

Support formalisation of ASM supply chains, particularly for gold and 3T. Interim measures in practice (but not law), such as allowing for payment of ASM royalties by traders and low-cost licensing of local traders introduced by some districts, is a step in the right direction. Elimination of the royalty on ASGM holds promise, despite risks related to cross-border smuggling. Planned legislation should draw from positive and negative lessons learned in other countries (e.g., Guyana, Ghana, DRC), while adapting for existing Ugandan systems of ASM production and trade.

Create dialogues and formalise coordination arrangements between institutions to streamline mandates, optimise outcomes, and support monitoring and evaluation. Current policy and legal reform processes provide an excellent platform for dialogue but additional focused efforts will be needed. Objectives should include:

- Identifying measures to mitigate overlapping mandates and optimise resources to tackle a range of issues (e.g., construction minerals governance, environmental oversight, health aspects)
- Establishing systems instruments and procedures to collect, disseminate, and use ASM data in order to effectively assess, monitor, and evaluate progress towards formalisation
- Defining mandates, roles, and responsibilities of key institutions in law (e.g., mining, local government, health and environment authorities).

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Annex 2: Further Comments on Legal Aspects

This annex extends the analysis of legal aspects in section 2. In particular, it elaborates in more depth on the background of **ASM policy and legal framework**.

Around 90% of Uganda's minerals are produced through ASM and an estimated 300,000 women and men are directly involved in ASM, with up to 4.9 million Ugandans indirectly benefitting from these activities. 'Despite its importance to local economies and livelihoods, the ASM sector remains largely … informal; only about 5 per cent of miners are formally licensed …[116].'

Since 2008, ASM activities have been growing 20–40% mainly because of new mineral discoveries, an expanding population, land pressures and the loss of traditional pastoralist livelihoods[117].

This scenario highlights the fact that ASM activities are a reality in Uganda and will very likely stay in Uganda for a long time to come. However, the current lack of success with legalisation and formalisation constitutes a problem that needs to be addressed if the objective is to develop and improve the ASM mining operations and related supply chains and maximise of the economic contribution of ASM for the local and national economies.

The importance of the legalisation of ASM mining operations and its supply chains is based on the implications of informality for ASM operations and for the economy of the country. 'Informality limits the potential for developing countries to benefit fully from their integration into the world economy. In particular, large informal economies prevent countries from developing a sizeable, diversified export base, as the capacity of companies and economic projects to grow is constrained[118].

Nevertheless, informality is growing worldwide and it poses a question about the roots of this phenomenon and, perhaps more importantly, about the strategies to overcome the current trend. The debate is vast and complex but the following two quotes may shed some light on how to approach informality and build a strategy to address it:

> It would seem that the developmental goal should be equally based on how to make labour markets work more efficiently and more equitably for both workers and small businesses. The main benefit of formalisation should be considered in terms of the increased social and economic security which it facilitates by both extending social and labour protection to previously excluded workers and, at the same time, offering increased opportunities for enterprise development support to be delivered. Formalisation builds a platform for investment and enables informal operators to take a longer perspective on their future than day-to-day survival allows[119].

And:

> It is suggested here that under conditions of high unemployment and growing poverty, as is the case in Sub-Saharan Africa (SSA), the informal economy is likely to expand and should be viewed more positively with a view to enhancing its productivity by removing institutional obstacles to the achievement of higher productivity. (…) The informal economy has a role to play in generating incomes and wealth and the formal private market mechanism alone cannot be relied upon to solve the poverty and unemployment problems in SSA. If SSA is to make any significant progress towards achieving poverty reduction goals, policy must focus on informal economy strategies that encourage its participants to engage in the wider economy. The quest to formalisation of enterprises needs to be addressed from various different angles; by reducing entry and operating formal costs, increasing the incentives for MSEs to operate formally, reducing obstacles to their growth, and searching for inexpensive approaches through which to enforce compliance with government regulations[120].

[116] Crawford et al. 2015
[117] Hinton 2012
[118] Bacchetta et al. 2009
[119] ILO 2009
[120] Aryeetey 2015

Annex 3: Detailed Case Study: Karamoja

The Karamoja Region, located in the north-eastern corner of Uganda, boasts occurrences of over 50 different minerals that have prompted an influx of multiple companies over the past two decade, most of which have focused on production of gold, limestone, and marble[121]. Despite this, **the region continues to be one of the most under-developed in the country**, much of which is linked to extended droughts and flooding periods causing widespread food insecurity, inadequate social services and poor infrastructure coverage (roads, schools, hospitals), and cattle-rustling associated conflict, among others.[122] In periods of extreme food scarcity, according to one local government officer 'poverty and food insecurity is so severe that, in many households, only two meals are eaten per week'[123]. In response to conflict, climate, economic, and land related pressures, thousands of Karamojong men, women and children have abandoned their traditional agro-pastoral livelihoods to engage in ASM, with employment estimated at 18,000 in 2008[124] and 22,500 today.

Figure A14: Karamoja Region

This chapter summarises the assessment of selected gold mining sites (Rupa and Morita) in Karamoja. The Rupa gold mining area is located approximately 10 km north of Moroto Town in Moroto District and Morita is approximately 80 km south of Moroto, in the Nakapiripirit district (see Figure A15). In addition to the work conducted in the field, the current assessment draws from a vast number of studies carried out in Karamoja[125].

A3.1. Area Overview

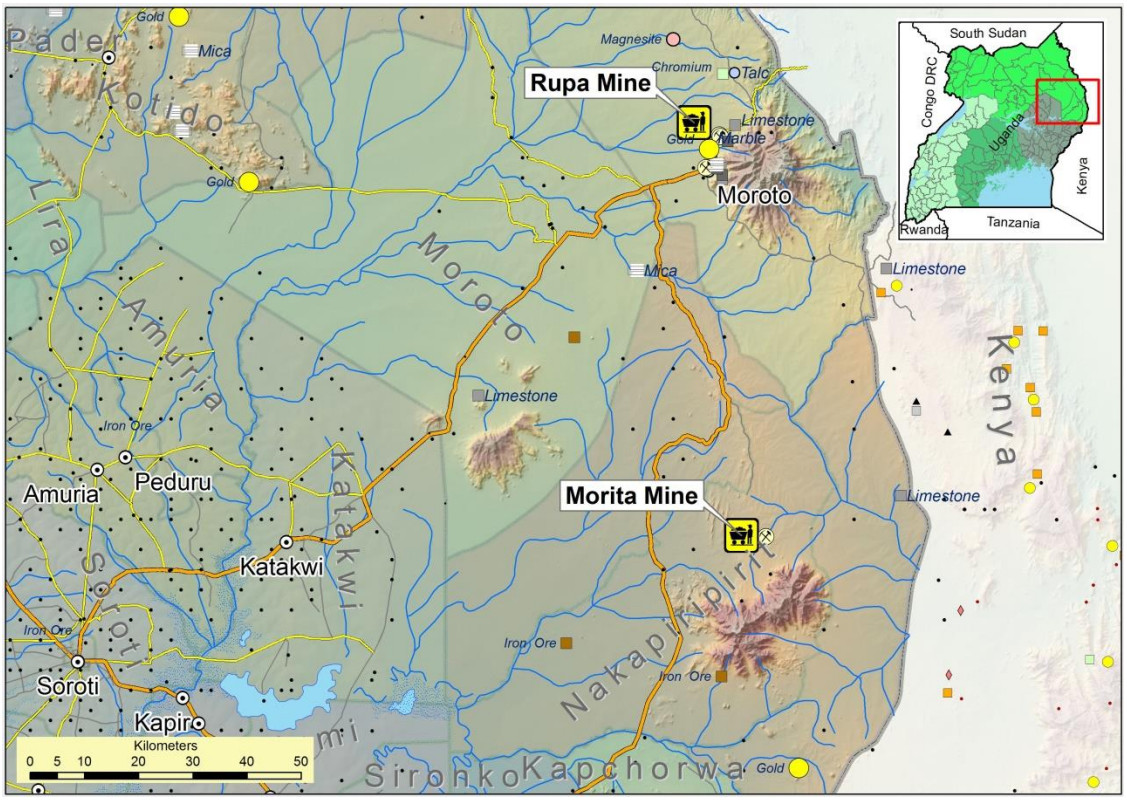
For the Karamoja Case Study, two sites were visited: the Rupa and Morita gold mines (Figure A15).

The **Rupa gold mine** is located approximately 10 km north of Moroto. Mining is scattered and it qualifies as subsistence mining usually performed in family units. Rupa has some of the highest levels of participation in Karamoja with approximately 10,000 miners extracting gold.[126]

The **Morita mine** is located in the Nakapiripirit district. Gold in Morita is found in hard rock deposits, requiring additional steps for recovery. From April to October, the mine has very low activity due to the flooding of the mine shafts.

[121] Hinton et al. 2011 *[P; OBS, baseline]*
[122] Ibid
[123] Ibid, p. 5
[124] MEMD 2009
[125] Hinton et al. 2011 *[P; OBS, baseline]*; Delany 2011; Ngabiirwe et al. 2012; Kabiswa et al. 2014; Houdet et al. 2014; ECO 2014; ECO n.d.; Burnett & Evans 2014; Alyebu et al. 2015
[126] Interview with ECO NGO in Moto 22 September 2016.

Figure A15: Karamoja study area



A3.2. Supply Chain Stakeholders

This section outlines the main players engaged in the gold supply chains in Karamoja, the system of mineral production and related gender, environmental, and occupational issues therein.

A3.2.1. Main Supply Chain Actors

The supply chain is quite short and influenced by geographical characteristics. Moroto is less than 20 km from the Kenyan border, where gold mining is reported in Lokiriama (Turkana district) 44 km from Moroto. Moroto is also far (500 km) from Uganda's gold trading capital, Kampala. Although geographical proximity to Kenya implies that gold should be sold in Kenya, since 2013, when Kenya cancelled export licences for gold, Karamoja gold is believed to end up in Kampala's informal gold market. Given its proximity to Ethiopia, where gold is purchased at international prices by the national bank, a proportion is likely also smuggled to this more lucrative market.

Supply chain stakeholders include:

- **Miners** usually work in family units or in village groups. In Rupa, alluvial mining is performed manually and can be considered as subsistence mining rather than entrepreneurial activity. In Morita, where activities have waned considerably, hard rock and mainly underground mining requires a structure involving pit financing or sponsors, who receives a larger proportion of production than workers.
- **Mine site buyers** buy the gold on the mine-site, or in case of sites where mining is dispersed across a broader area, usually from local markets. Mine site traders can act as independent or as representatives of district traders.
- **Regional traders** usually buy in the capital cities or send buyers to the mine sites or local markets
- **Kampala traders** concentrate gold in the capital and sell it locally to AGR[127] or physically export the gold to other refiners, mainly in the UAE.

Official statistics on Uganda's gold exports are somewhat inconsistent.

[127] http://www.agr-afr.com/

- According to the DGSM, gold exports in 2015 totalled 13 kg (valued at approximately USD 448,000[128]), of which 81% was imported from South Sudan[129]. According to the same report, the officially reported production of gold for the same year amounted to 12.7 kg.
- According to the BOU, gold exports rose recently from USD 250,000 in 2013 and 2014 to USD 230,000 in 2014 and 2015 to USD 204.26 million in 2016, making gold, which is the second biggest export product after coffee[130]. Officials attribute this increase to the recent start of operations of **AGR**, which refines gold from Uganda, but mainly from DRC and Tanzania[131].

A3.2.2. Mineral Production Methods and the Gender Division of Labour

Two types of gold production systems exist in Karamoja:

- **Alluvial gold production**, wherein gold is 'free' (not bound to other minerals) within weathered or eroded soils
- **Hard rock gold production**, where gold occurs in veins of rock (quartz) that must be crushed and pulverised to free the gold in order to recover it

These systems are different in terms of the methods used, organisation and gender division of labour, nature and severity of occupational and environmental risks, and other factors. These differences are illustrated by conditions observed in Rupa and Morita.

Figure A16: Karamoja miners using simple tools

The first type of production system, as found in Rupa, is more indicative of most activities across the region. This involves extremely basic, highly manual methods to recover gold from types of deposits (alluvial or colluvial) where gold is usually very low in concentration (low grade) and requires processing of relatively high volumes of ore (gold bearing soils and weathered rock).

- **Extraction** is carried out by digging relatively shallow pits (approximately 2–5 m) using simple tools (pry bars, spades, pieces of wood) in largely unconsolidated soils. Once a gravel layer is encountered, material is extracted using basins and then tested for gold by panning. Where present, tunnels are dug laterally and follow the 'reef' for, in some cases, up to 50 m. Although digging is more common for men than women, both undertake the activity. If an area is seeing good yields, up to eight people or more may work in the same tunnel, with production shared by the miners.

[128] DGSM 2016, p. 93 ('Table: Mineral Exports as per Permits issued and for minerals produced in year 2015'). Export value reported in Uganda shillings. Foreign exchange rates based on average rates provided by oanda.com.
[129] Ibid
[130] BOU 2016a, p. 163 ('Table: Composition of Exports)
[131] Muhumuza 2016

Figure A17: Male (left) and women (right) miners digging shallow pits in Rupa

- **Hauling** of ore to panning areas is undertaken mainly using basins, and by young boys and mainly girls. Both women and girls haul water in jerry cans, in some cases over distances of 3 km or more.
- **Panning** is undertaken mainly by women using simple basins, often within small holes dug into the ground to enable retention and reuse of process water.

The second type of ASGM where gold occurs in rock is found in Morita, as well as in Acherer (Tapac), Karita (Amudat), and previously in Lopedo (Kaabong), among other localities. During the time of the assessment, work had largely been halted for three months due to flooding of shafts and lack of water pumps. Despite this, approximately 170 families continue to live at the site and seek out a meagre living until conditions are rectified. The production system is described as follows.

Figure 17: Flooded Shaft in Morita

- **Extraction** is financed by a sponsor, wherein of 10 previously active pits, five are owned by men and five by women. Lack of suitable tools and equipment have largely halted production, with common practice involving digging of marginally supported shafts in rock using pickaxes and sledgehammers, with occasionally rock breaking inefficiently undertaken by hiring a hand circular saw from a local shop owner at a cost of UGX 100,000 or USD 34 per month plus an addition UGX 80,000 or USD 27 to purchase diamond blades as needed. A more suitable choice, using jackhammers to break rock underground, had been attempted but was deemed inefficient and was thus abandoned. This was likely due to misuse (e.g., poor maintenance, infrequent bit sharpening and replacement) or poor selection (e.g., inadequate size given hardness of rock).
- Vertical shafts can extend to depths of up to 15 m until gold-bearing veins are encountered. The longest lateral or inclined tunnels at depth continue for an additional between 4 and 5 m before the gold-bearing veins narrow and disappear ('pinch out'). Once rock is broken from the rock wall, it is hauled to the surface for grinding.
- **Grinding** of ore is done mainly by women using grinding stones. This task may be paid, or if a spouse of the miner providing the ore, undertaken for free. If paid, this depends on the amount of gold recovered (e.g., if 2 g were recovered in a basin, those performing the service receive 2 kg of ore; if recovery was particularly low, they receive approximately UGX

Figure A18: Ore grinding

5,000 or USD 1.7 per basin. Because the rock is very hard, a single person typically grinds a maximum of one basin per day.
- **Panning i**n basins is typically done by a team member (a man or woman) or wife of miners extracting ore and seems to be largely unpaid. A panner can process four basins within a period of 1–1.5 hours.
- As found in most hard rock gold sites across Uganda, in Morita, almost 100% of underground miners are men. Both young boys and girls undertake hauling of ore and water and, in large part due to levels of extreme poverty in the area, incidences of child labour are pronounced.

When in full production, miners in Morita were working on one of three eight-hour shifts per day, with two hours of break time spread over each shift. In a team of eight workers, four men would work underground and expect to recover four basins of ore in total, with three basins divided between them and the remaining basin given to the sponsor (team leader). Remaining members of an eight-member team include both women and men who are paid UGX 3,000 or USD 1 each per shift for hauling rock or water and for panning. In addition, a cook for the team receives one basin of ore per day.

A3.2.3. Employment and Production

Prior estimates for employment in gold mining in Karamoja saw a growing workforce, from 15,000 in 2008 to 18,000 in 2011[132]. Current estimates account for the rise and slow decline of rush populations and suggest that the number may be closer to **22,500 men, women, and children** across the region. Given the current out flux of many from former rush sites, only about 1,500–2,500 miners are estimated to be active in hard rock, primary gold sites across the region. Thus, the majority are undertaking alluvial, subsistence mining.

Nevertheless, employment numbers may be much higher than those estimated particularly when seasonality is more closely scrutinised. Previous research cites reports from local leaders and miners that, particularly in Moroto and Kaabong Districts, *all* residents of many sub-counties, from teachers to farmers to shopkeepers, abandon their daily work in the rainy season to pan for gold in the rivers. In Rupa, many gold miners shift to ASM of limestone and marble in the dry season to meet basic needs and return back to gold mining when rains recommence and water for panning is readily available.

Productivity on a per miner basis, as found in the Rupa mines, is extremely low (estimated at 0.12 g of gold per day per miner). Production is significantly reduced in the dry season due to lack of water for panning. Thus, dry and wet season variations of 0.1–0.3 g per person per day are estimated (based on field assessments). However, due to the large number of gold miners across the region, cumulative production is relatively significant (section A3.3.1).

A3.2.4. Environmental and Occupational Issues

For both Rupa and Morita, **production rates and occupational and environmental risks are directly tied to conditions of water over-abundance or scarcity**. Under these conditions, desperation causing miners to take undue risks and/or inadequate knowledge, skills, and resources to identify and address these risks is a recipe for disaster. In summary:
- In Rupa, miners work in un-supported tunnels 2–5 m below ground, dug in weakly consolidated soils. Risks of collapse are greatest in the rainy season, ironically when water needed for panning is most readily available. Within one small group of approximately 35 miners in Rupa, four fatalities were due to underground tunnel collapses in 2015 alone. In a neighbouring group of 30 miners, three deaths had occurred over the previous two years. Although this is clearly an extremely small sample size, this suggests a **fatality rate on the order of 8% per year**. Snakes pose an additional risk, both underground and at surface, particularly given difficulty accessing anti-venom and health services in general in the region.
- In Morita, **timbering is generally limited to the headframe** (shaft opening). Despite this, the hard rock conditions provide some degree of stability, particularly when compared to the weathered soils in Rupa and other alluvial sites. Typically, the ore is situated within a shear zone that can cause rapid influx of groundwater and halt production entirely, as is the current case. Therefore, risks of rock falls, tunnel collapses, and potentially drowning increase under these conditions.

[132] MEMD 2009; Hinton et al. 2011 *[P; OBS, baseline]*; ECO n.d.

Inhalation of silica-rich dust during breaking rock underground and while grinding at surface place women and men undertaking this work at great risk of developing silicosis.

- In both cases, **lack of connectivity between tunnels** (which would provide for both airflow to improve ventilation and an escape route in the event of collapse) and introduction of timbering practices at depth and water pumps would reduce these risks considerably.
- Particularly in the dry season, **risks of heat exhaustion and severe dehydration are high.** Most workdays in Rupa typically commence at 7 am and stop at 2 pm, while in Morita, miners work for six hours periods within an eight-hour shift.
- Main environmental concerns relate to **large numbers of abandoned pits** across ASM areas, which can pose significant risks for livestock and people walking around the area. Lack of backfilling practices and haphazard disposal of waste material (waste rock and tailings) also provide impediments to other land uses.
- In both Morita and Rupa, **water quality of local rivers can be significantly degraded through siltation due to in-river panning and/or run-off of tailings.** Fortunately, no evidence of chemical processing (e.g., mercury amalgamation) was observed in Karamoja during site assessments and has not been previously reported.

A3.3. Distribution of Economic Costs and Benefits across the Supply Chain

A3.3.1. Production Value and Sales

In the Rupa mines in Moroto, production was estimated at 0.12 g of gold per day per miner (0.3 g in wet season and 0.1 in dry one for a unit of two miners: one extracting and one washing). As described above, seasonal water scarcity and abundance plays a key role in production.

Considering Karamoja's mining population of 22,500 miners, **the total regional gold production is estimated to be in excess of 845 kg per year** representing a LBMA market value of USD 36 million (in September 2016 with average LBMA price). This is the minimum amount given that hard rock mines in Nakapiripirit region are reported to be more productive (when in operation) than alluvial mines but have been excluded from the estimate[133]. Total estimated gold production (845 kg) represents 42% of the country's estimated ASGM production of 2 tonnes.[134]

A3.3.2. Karamoja ASGM Income and Distribution

Income and Revenues of Supply Chain Actors

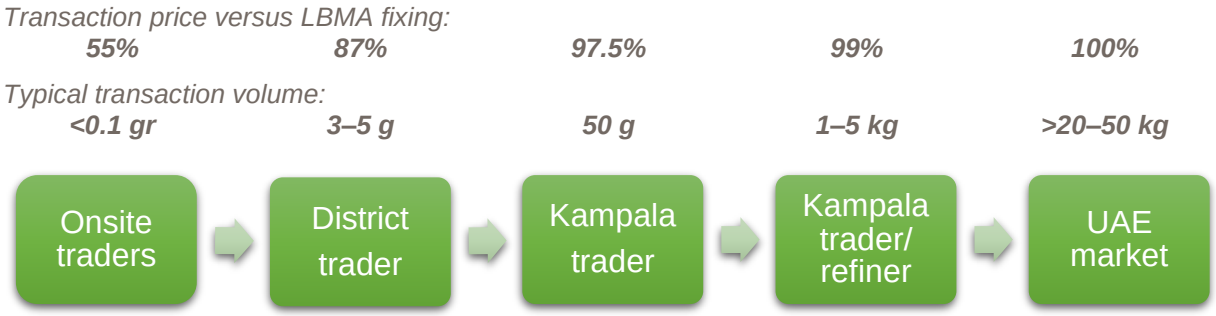
On-site buyers were found to mislead sellers by adulterating the scales to weight the gold. Miners are not always well trained to understand buyers' fraudulent actions. A particular interesting case in the Rupa local market was that one buyer was supposedly buying at the same price than the Moroto traders. However, the scales were set to weigh in pennyweights when the reported weights to the sellers were in g. This means that the weight was discounted by 36% (1 pennyweight = 1.5552 g).

Figure A19: Gold buyer's scale

This leaves only 55% of the LBMA gold value to the miners, or at the Karamoja level USD 17 million per year (based on 2015 gold price average), or for a population of 22,500 miners an annual income of USD 770 per miner[135]. The distribution of the gold value (based on the Rupa mines) is shown in Figure A20.

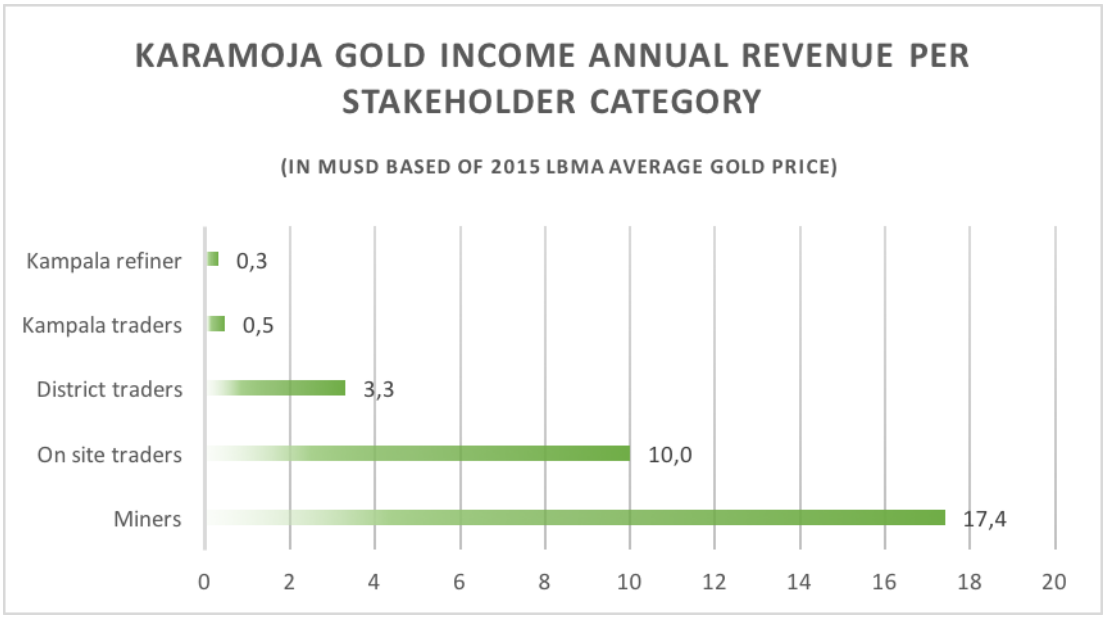
[133] Although they were not operational during our visit.
[134] According to Kampala's traders' interviews.
[135] Although hard rock gold production represents a small proportion of the total ASM workforce in Karamoja, it provides indications of potential earnings and revenues provided by such as scenario. The common alluvia scenario used in regional estimates contrasts drastically from Morita, which has largely been out of production for the past three months due to pit flooding, but conditions are believed to be more comparable to hard rock

Figure A20: Karamoja ASGM supply chain (buying prices are expressed in % of LBMA fixing)



In the absence of a detailed census of persons per stakeholder group beyond the informed estimation of miners (e.g., number of onsite and district traders), revenue distribution is most reliably reflected by stakeholder groups (Figure A21).

Figure A21: Revenue share per stakeholder group



Government Revenues

If Karamoja gold would pay the 3% royalty, based on the 2015 average gold price, it would have generated a royalty of USD 95,000, 10% of which (USD 9,500) would accrue to district governments and 7% (USD 7,000) to the sub-counties where activities take place, with the balance (USD 76,000) retained in the consolidated fund.

A3.3.3. Social and Gender Dimensions of the Distribution of Costs and Benefits

Given levels of extreme poverty and food insecurity coupled with environmental and climate conditions constraining agricultural livelihoods, **ASM draws entire families into the sector**: men, women, boys, and girls. This is particularly true for those clans that have lost all or most of their livestock due to cattle rustling, a practice that has seen some decline in recent years. Given the economic benefits, many

scenarios in Amudat, Tapac and Kaabong Districts. Given high mining costs associated with the depth and hardness of the rock, the grade is not surprisingly high, up to an alluring maximum of 150 gs per tonne, with between 0.3 to 3 gs per basin worth approximately UGX 80 (USD 0.03) to 90,000 (USD 30.6) per g. When Morita is in full production, incomes seem to vary with grade between UGX 24,000 (USD 8.2) and 270,000 (USD 91.8) per day for each miner and sponsor, with those undertaking grinding earning between UGX 5,000 (USD 1.7) and 18,000 (USD 6.1) per day and those in hauling typically earning UGX 3,000 (USD 1) per day. When wives of miners grind or pan ore produced by their husbands, they are unlikely to receive payment for services rendered.

women and men miners have been able to reacquire livestock and many contend that they would prefer to engage in both ASM and their traditional agro-pastoral livelihoods jointly.

Polygamy is common practice in Karamoja and this, combined with conditions described about, accounts for **womens' and girls' high rates of participation, approximately 50–80% in most alluvial areas** (and up to 90% in certain gold sites in the region[136]). As explained by one experienced man miner in Rupa, he works with his four wives and daughters, while his sons are typically at home or tending to the livestock purchased from gold mining. Conversely, **women's participation is much lower in hard rock, mainly underground gold production scenarios (approximately 30–40%)**, as found at Morita and other former rush areas. In these cases, many of the miners are men who migrated from other regions in Uganda or other countries (e.g., Kenya). Some brought their families (or established new ones) in the area, and wives and daughters became engaged in ASM, mainly in processing (grinding, panning) and hauling activities.

In Rupa, as in the traditional family-unit and subsistence-driven ASM scenario found across Karamoja, **rates of child labour are high** (estimated 20–30% of workforce) and appear to be even more pronounced for girls than boys. Participation of children appears to be much lower (although cannot be precluded) for hard rock ASM as found in Morita. This difference may be due to a number of factors. Hard rock mines require greater financing than alluvial production and an organisation of work that is more comparable to a small enterprise, often lending itself to establishment of internal rules. Perhaps most significantly, hard rock ASM yields considerably higher individual incomes than in alluvial production, attracting a greater number of workers, availing parents with more resources to send their kids to schools, as reported by a number of women and men miners in Morita. In these scenarios, **children engaged in ASM work are more vulnerable to occupational risks** according to their different stages of their development and, in some cases, gender and face a host of psycho-social impediments that can impair their development, including related to denial of their right to education.

Capacity to control and make decisions concerning use of earnings seems to vary widely. Some autonomy (and high levels of responsibility for family well-being) are reflected by one 14-year-old girl working with her uncle, who reportedly spent her previous weeks earnings (approximately UGX 10,000 or USD 3.4) on food for her family and some beads for herself. In one family group in Rupa, a man miner declared that decisions concerning use of revenues from ASM, ranging from UGX 3,000 or USD 1 per day in the dry season to more than UGX 30,000 or USD 10.2 per day in the rainy season, were made together with his wives, much of it spent on maize and requirements for the women to make and sell local beer. Conversely, in Morita, although rates of payment for pounding and panning ore (mainly an activity of women and girls) are known, it seems that most work is unpaid to supplement a spouses ore production.

Aside from agro-pastoral livelihoods and ASM, the next most lucrative economic activity seems to be production and sale of local sorghum-based alcohol, which can yield earnings (mainly for women) around UGX 20,000 or USD 6.8 per week. Although it provides a form of indirect employment, **alcohol abuse is pervasive across Karamoja and ASM areas in particular**, and with it other social ills, including SGBV and, particularly with the emergence of rush and post-rush scenarios, growth of the sex trade and escalation of HIV/AIDS and other STIs, such as syphilis[137].

Inequalities in power, influence, and capacity have critical development impacts at all levels. With respect to gender inequalities, although women may comprise up to 80% of the workforce, within the household many have little say in decisions concerning use of revenues. Within the mine sites, given low levels of literacy and access to information, miners have little awareness of fair sale prices and can often be exploited, including by use of faulty scales to weigh gold, as observed in Morita. Furthermore, local miners are ill-equipped to obtain licences for their activities, particularly given current licensing requirements (e.g., cost, distance to Entebbe, bureaucracy), particularly compared to the relative capacity of larger exploration and mining companies.

Given pervasive gender inequalities, including in terms of agency and freedom, decision-making power, literacy, and numeracy, coupled with domestic work burdens and other factors, **women are at greater disadvantage than men in addressing these power imbalances**. Target efforts are warranted, such as those undertaken by the Ecological Christian Organisation to organise women,

[136] Hinton et al. 2011 *[P; OBS, baseline]*
[137] Ibid

leading to formation of almost 70 women miners' groups in ASM areas of Rupa and Tapac. These groups have enabled members (75% of which are women) to consolidate savings in a group fund (with individual contributions recorded by a secretary) to be dispersed at the end of each year. In Rupa, members express benefits to being part of these miners' groups, including paying for school fees; investing in housing, goats, chickens and turkeys; and purchasing iron sheets for their homes. Expectations for contributions to groups are known and accepted by women's spouses, ensuring that at least some portion of proceeds is allocated to them.

District mining watch platforms in Abim and Moroto Districts are also positioned to play a role in addressing gender inequalities as well as in advancing efforts to formalise ASM and improve its technical, environmental, occupational, and economic performance. Local government also supports any efforts to boost job creation and to increase incomes, particularly of youth, and including recognising unique livelihoods, environmental and climatic challenges within the region.

A3.4. Key Conclusions from the Karamoja Case Study

Efforts over recent years by the Minister of State for Karamoja Region, under the Office of the Prime Minister, as well as support from DFID and a range of development partners, have seen some improvements with respect to roads, water resources, electricity, agricultural development, and peace and security, among other areas. However, development of the region will require intensive and sustained multi-pronged efforts to progressively address the diverse challenges facing the region.

With respect to challenges and opportunities provided by ASGM production:

- **ASGM production provides an important source of livelihood**, providing direct employment for at least 22,500 Karamojong and injecting approximately USD 17 million (approximately 55% of the total value of gold mined) into the local economy via expenditures by miners.
- **Lack of knowledge is one of the main reasons for low income of miners.** For example, systematic cheating by buyers has been observed. It is recommended that miners receive training to assess the value of their production. Teaching the miners how to weigh and value their gold production would be an easy measure to increase miners' revenues. Organising them in groups to sell collectively their gold will avoid gold transaction of small quantities (0.05 g usually) that always disadvantages the miner in selling transactions.
- **Although women and girls constitute 30–80% of the ASM workforce (depending on the site), they often have marginal control of revenues.** High participation rates can be attributed to a combination of widespread, extreme poverty; climatic conditions constraining crop growing; and the widespread practice of polygamy, which is particularly significant in the context of ASM practiced in family groups. Pervasive gender inequalities and norms concerning decision-making over revenues are key factors resulting in a disparate distribution of negative impacts and positive benefits.
- **Inefficient methods and lack of knowledge and resources to improve them perpetuate individually low incomes and occupational health risks.** A number of intermediate, appropriate, and low-cost technologies methods coupled with access to financing mechanisms and efforts to improve the culture of savings are critically needed. Women's ASM Groups in Rupa and Abim provide good models.
- **Access to water and improved water management practices should be a priority.** An easy way to improve productivity while reducing reliance on child labour, especially in dry season, would be to provide water in tanks every day at the mine sites. This activity could be promoted by empowering selected local people and financing small tractors and tanks that would allow them to offer water services to miners. Providing sufficient water for processing all year would boost the dry season production.
- **Any efforts must jointly tackle the critical occupational risks at the site.** Risks associated with underground instability, ventilation, flooding, and chronic dust exposure, among others, have been identified. In periods of water scarcity, heat exhaustion and severe dehydration coupled with food insecurity caused by low production rates pose significant concerns. Other health risks associated with alcohol abuse, SGBV, and HIV/AIDS and other STIs warrant additional attention.
- **Child labour is pronounced, particularly for girls.** High participation rates can be attributed to a combination of widespread, extreme poverty; climatic conditions constraining crop growing; and the widespread practice of polygamy, which is particularly significant in the context of ASM practiced in family groups. Gender divisions of child labour are linked with traditional roles of men and boys in cattle-keeping, which culturally holds significant value.

- **Power inequalities result in perpetuation of the status quo.** These range from inequalities between men and women within the household to those between miners and traders and between miners and better-equipped licence holders. This, coupled with low levels of education, access to information and limited resources of the average miner, place ASGM workers at risk of exploitation and perpetuation of their poverty, increasing the impetus even further for formalisation.
- **Targeted training and outreach campaigns are needed targeted to the priorities of beneficiaries.** This includes accounting for demographic characteristics (e.g., literacy, financial status, language, etc.) and technical aspects (e.g., current methods, water resources, environmental, occupational and social risks, etc.) as found in Karamoja. For example, the main *technical* training priorities identified in the case study sites include the following:
  - Increasing efficiency of methods and addressing water shortfalls (dry separators; centralised water resources e.g., side valley dams, reservoirs, tanks); where water is available, basic sluicing technology would see significant production and income gains.
  - Priorities also include occupational health risks (timbering, tunnel stability, dust mitigation, water management) and community health and child labour issues (alcohol abuse, SGBV, HIV/AIDS and other STIs).

Annex 4: Detailed Case Study: Kampala Clay Area

When it comes to construction, Ugandans prefer using low-cost, locally available materials[138]. As an effect, bricks (either burnt or sun-dried) are the most used construction material in the country: 50% of rural buildings and more than 80% of urban ones are mainly made of bricks[139]. Bricks fabricated by artisans have the largest share of the market and are suited for single storey buildings[140]. As Hinton noted in 2009, 'ASM is to the construction sector what fuel is to the transport sector.' Uganda's construction sector directly depends on ASM[141].

The majority of commercial ASM clay operations in Uganda use ball clays—highly plastic, easily mouldable, and readily available in wetlands across Uganda—to produce solid bricks for construction and, to a much lesser extent, ventilation and facing bricks and other clay products (e.g., clay stoves, pots, roofing tiles, drainage pipes)[142]. Using a similar production process, the most economically disadvantaged Ugandans mainly rely on burnt and unburnt bricks made from clay-rich soils (murram) producing extremely low quality, low value bricks used to construct basic homes.

Given its commercial and employment significance, the sector analysis is focused on production of solid bricks from ball clays.

A4.1. Area Overview

Two clay sites were visited and analysed for this case study: one located between Entebbe and Kampala called 'Lumala' and another next to Kyetume village near Mukono called 'Gaza' (Figure 23, next page). The location of other clay and brick making areas in the immediate vicinity of Kampala are shown in Figure A23. Sites were assessed in Wamala Subcounty of Wakiso District and Nakisunga Subcounty in Mukono District, but were further supplemented by earlier assessments of the production process, labour demands, and environmental, occupational and social issues.

Figure 22: Clay stove

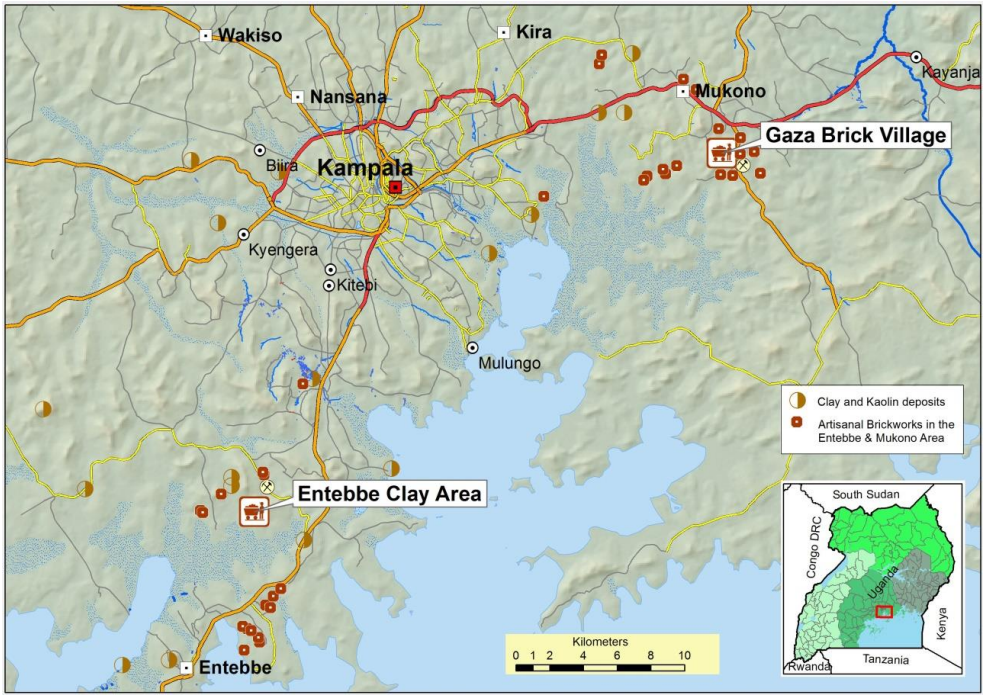
Clays occur widely in many parts of Uganda, particularly in the wider Kampala/Entebbe area of Central Uganda. Precambrian rocks that include sedimentary and metasedimentary lithologies and comprise fine-grained sandstones, slates, phyllites, and schists have undergone extensive weathering and erosion and are locally altered to form considerable clay deposits. In deeply weathered areas, parts of the basement are exposed in the form of undifferentiated gneisses and late granites (these rocks are also extracted to provide for construction material). Clays derived from gneissic and granitoid rocks of the basement are leached and enriched in quartz and are normally separated from the bedrock by a layer of large quartzite pebbles. **The clays occur as superficial layers with a general thickness of 2–5 m.** The main features of the clays are their low wet-to-dry shrinkage, refractory nature, and an extremely high plasticity, which varies with kaolinite content. Due to their high plasticity, these clays can be classified as ball clays, which makes them suitable for pottery, earthenware, and binders in refractory material production[143]. These are the main sources of clay used in brick production and are readily available in valleys and wetlands across Uganda.

Different types of clay are suited to different products different market potentials and values. Ball clays with higher kaolin content have increased value due in part to their decreased likelihood to crack and, for some products (e.g., visible ventilation bricks, pots for plants), lighter colour[144]. Such clays are also used for fabrication of clay stoves (see Figure A22), with approximately 1 tonnes of clay,

[138] Hashemi et al. 2015
[139] Ibid
[140] Hashemi & Cruickshank 2015
[141] MEMD 2009
[142] Hinton et al. 2008
[143] Mathers, S., J. 1994; Nyakairu et al. 2002
[144] For example, a 'standard' orange solid brick is sold at approximately UGX 250 (USD 0.09) while a whiter, kaolin rich brick sells for UGX 300 (USD 0.1). .

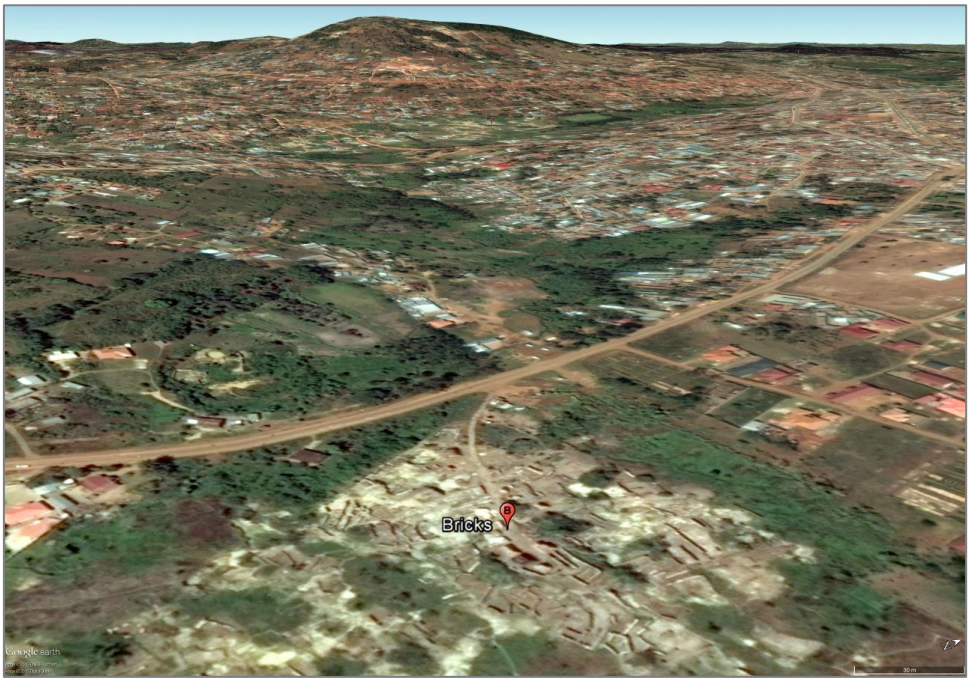
producing approximately 750 stoves sold for UGX 30,000 or USD 10.2 each. China clay is comprised almost completely of kaolin, with purest varieties used for making fine porcelain kitchenware, and less pure ores used as filler in pigments, as mortars and plasters, and in the production of cement, paper, and pharmaceuticals.

Figure A22: Kampala study area



Proximity to market is a key factor in profitability. Multiple brick production sites in Mukono District, for example, are found in densely populated peri-urban and emerging urban areas close to the brickmakers' market (Figure A23). Historic remote sensing images on Google Earth even suggest (unfortunately at low resolution) a sequence where clay extraction sites, once the deposit is depleted, are subsequently developed into housing and trading centres.

Figure A23: Brickworks near to Gaza Village in Mukono District[145]



[145] Processed Google Earth® view

A4.2. Supply Chain Actors, Activities, and Production Costs

A4.2.1. Main Supply Chain Actors

The artisanal solid brick supply chain is direct and short. Bricks are usually fabricated and sold directly on the clay extraction site[146]. **Extraction, processing, and commercialisation are done in the same location.** Production locations are locally known and typically abundant and easy to find. Consequently, there is a direct relation between the user (home builder or contractor) and the brick producer. Without traders between the customer and the supplier, revenues for the brick makers are maximised (although differences in the distribution of revenues at the site level are distinct, as discussed further below).

The supply chain is constituted by three types of actors.

- On one side, the **landowner** is paid an annual fixed sum by pit owners or sells a plot of land. In both cases, she/he also receives a royalty (production share) per fabricated brick.
- The second stakeholders are the **pit owners** or team leaders. They are the entrepreneurs of the activity, investing in the acquisition of the plot for clay extraction, or paying an annual rent to the landowners. They also pay the salaries of the workers and finance the fabrication and marketing cycle of the bricks.
- The last stakeholders are the **miners** working for the pit owners/team leaders.

A4.2.2. Mineral Production Methods and the Gender Division of Labour

The system of production in a typical clay extraction and brick production site involves: extraction and preparation, moulding, drying, stacking, kiln construction and burning, cooling, and selling.

Extraction and preparation: Once a site is prepared by removing vegetation and topsoil, extraction is carried out by digging pits into thick clay layers using spades and hoes. Pits are often relatively shallow (about 2 m deep), but can extend to 4 and 5 m depending on the thickness of the clay and proximity to the water table. They can cover wide areas, with dimensions ranging 3–5 m to approximately 100 m in diameter. Clay is hauled, sometimes using buckets and basins, then (at some sites) piled adjacent to pits and covered with grasses for up to two weeks. Following this, water is added to the mound, mixed, and compacted by trampling by foot, then left to rest for another two to three days.

Figure A25: (top left) Clay extraction; (top right); clay prepared for moulding; (middle left) brick drying; (middle right) kilns for brick burning; (bottom left) kiln for burning ceramics; (bottom right) bricks ready for sale

[146] Some solid bricks and other types of artisanally produced bricks, such as ventilation or facing bricks, are more commonly sold in shops in trading centers near to production sites unless they are specifically ordered by consumers.

Moulding: Water is added to clay and then worked with a hoe prior to mashing the clay firmly into a wooden mould, resulting in 'green bricks' that are removed. A typical solid brick is 20 cm by 10 cm[147], although some variation in size exists. Moulds sometimes are used to produce higher value but lower demand ventilation bricks and facing bricks. An average moulder can produce 200–300 bricks in a single day.

Drying: Bricks are placed in a drying area and covered with grasses for two to three days, following which they are piled up in 2–3 m high stacks, spaced to encourage airflow, and covered again with grasses for a period until dry or until wood can be purchased for burning.

Kiln construction, burning, and cooling: A stack is made typically using 5,000–15,000 dry bricks and ranges in size from 2–5 m by 2–5 m and 3–4 m high. Depending on the number of bricks and kiln size, each kiln is equipped with two to five heating gates where fuel wood is placed. At many sites, the exterior kiln walls are plastered with clay and green bricks to retain heat internally and grasses are placed across the top to protect from rainfall. Due to poor kiln construction (including lack of plastering or green brick encasements), 24–46% of bricks can be under-fired[148].

Dry wood is placed in the gates, ignited, and kept burning for two to six days, depending on the availability of wood, size of the stack, and expertise of the operators. Following this, gates are sealed with bricks and the pile is left to cool, typically for approximately four days.

Kiln de-construction and selling: Kiln piles are typically deconstructed as lorries arrive to purchase them.

Although both women and men undertake all activities, **women are less frequently engaged** in kiln construction and de-construction and participate at much lower levels (estimated average 15%, with some sites as high as 35%).

[147] Hinton et al. 2008
[148] Hashemi & Cruickshank 2015

Work is mainly undertaken by teams of 3 to 10 people, who either share the proceeds from the work, after the team leader (oftentimes the landowner or main investor in wood) takes his/her share, or miners are paid (typically UGX 1,000 or USD 0.34 per day) by team leaders, who finance activities. Given the expansive size of many sites, this is often under the umbrella of a larger group, in some cases a community-based organisation (CBO) registered with the sub-county government.

A4.2.3. Employment and Production

The National Strategy for ASM identified in 2009, that 45,556 clay miners produced annually 4.05 billion bricks[149]. Extrapolating from this by the growing population and GDP contributions of the construction sector (as described in section A4.3.1. Production Value and Sales), it is estimated that **the brick sector is currently employing 92,500 miners and producing 8.2 billion bricks**.

A4.2.3. Environment and Occupational Safety and Health

Occupational risks are much less severe in clay mining and brick production than other forms of ASM (e.g., gold, 3Ts, stone quarries). Main issues relate to heat stress; injuries to the lower and upper body, limbs, and spine caused by ergonomic hazards (repeated motions, wrong methods of lifting, carrying); and, in the rainy season in particular, risks from prolonged and repeated water immersion, potentially leading to 'cold feet disease'[150]. **Mine workers typically lack any form of PPE.**

Most clay production takes place in wetlands, and even where pits are not flooded, these areas provide optimal breeding grounds for malaria-carrying mosquitoes. Furthermore, abandoned, flooded open pits create risks of drowning or injury resulting from falling in pits, which poses an issue for children, adults, and livestock in the area.

Few children were observed directly engaged in work during field assessments, the exception being younger boys of about 12–14 years of age, who will likely face significant future constraints given their impeded access to education. Children's participation in **brick-making has been identified as a major source of child labour** in the National Action Plan on Elimination of Worst Forms of Child Labour in Uganda (2012). Given children's increased susceptibility to these occupational risks and potential severity of physical and psycho-social impacts, particularly where participation equates to a denial of education, **children may be particularly vulnerable to these effects** impairing their development and future access to opportunities.

Environmental impacts are significant, with two issues posing the greatest concern:

- Based on production levels and footprints created by operations visited and on national production estimates, **approximately 10 km^2 of land (mainly wetland resources) may be degraded annually in Uganda**. Wetlands provide an important sink for water resources that buffers dry season water level declines and play important roles in treatment of wastewater and run-off. Thus, cumulative impacts on rivers and lakes, in particular Lake Victoria can be significant.
- **Degradation of forest resources** through consumption of wood, which is used for burning in kilns. Given that 91% of bricks produced in Uganda use wood fuel[151] and wood consumption ranges 7.8–10 tonnes of wood per 10,000 bricks[152], **an estimated 6.7 million tonnes of forest resources are consumed annually from brick production[153],** potentially impacting as much as 400 km^2 per year of forests from which it was sourced[154]. According to miners, wood most commonly originates from forests near to production sites, thus further increasing the strains on the natural environment of massive population growth around Kampala and other urban centres.

[149] MEMD 2009
[150] Hinton et al. 2008
[151] World Bank & UNDP 1989
[152] Hashemi & Cruickshank (2015) indicate an average 0.5 m^3 of wood to produce 1 tonne of bricks with a eucalyptus density of 560 km per m^3. Based on recent field measurements, weight varies 2.8–3.6 kg per brick or 357–278 pieces per tonne of brick, thus 10,000 bricks weighs 28–36 tonnes. Using wood consumption statistics from Hashemi & Cruickshank (2015), 10,000 bricks would require 7.8–10.1 tonnes of wood.
[153] By comparison, the construction sector consumed 34.4 million tonnes of round wood in their work in 2008 (Kaboggoza 2011).
[154] Calculated from 2015 estimates for sawn timber demand (607,000 m^3 with an area equivalent of 5,365 ha; in Kaboggoza 2011), using a eucalyptus density of 0.56 g per cm^3.

Figure A26: (left) wetland destruction; (right) firewood for brick making

In addition, given that 10–17% of clay is lost in transportation, handling, and construction[155], the footprint of mining activities is likely bigger than necessary. Additional impacts relate to emissions of carbon dioxide (and to a much lesser extent sulphur dioxide, nitrogen dioxide, and fluorine and chlorine gases). This is caused by the decomposition of clay minerals, micas, organic matter, and iron sulfides that occur in small concentrates[156].

Importantly, land or mine owners in some sites **convert depleted pits into fish farms**, providing an excellent example of post-mining land use that should be promoted. Given proximity to urban areas, particularly around Kampala, many former clay sites evolve into developed areas, with roads, housing, and other infrastructure, or become areas for planting of crops.

A4.3. Distribution of Economic Costs and Benefits across the Supply Chain

A4.3.1. Production Value and Sales

The 4.05 billion bricks produced in 2009 were sold at that time for UGX 150 or USD 0.05 per piece, generating an annual turnover of approximately UGX 608 billion or USD 207 million[157]. According to the UBOS, the basic heading price index for burnt clay, bricks, and tiles averaged 171.25 in FY 2008/9[158] and 288.25 in FY 2015/16[159]. Assuming that brick value followed the index increase[160]. a brick production volume as in the National ASM Strategy 2009[161] would today be valued at UGX 1.024 billion or USD 348,000[162].

It is likely that ASM brick production has increased in line with escalating demand. Construction GDP increased from UGX 1.8 billion or USD 612,000 in FY 2008/9 to UGX 6.16 billion or USD 2.1 million in the FY 2015/16, a 342% increase[163]. When corrected for the burnt clay brick index price increase (+68% for the same period), the construction GDP increased by 203%. Assuming that artisanal bricks constitute the same proportion of all burnt bricks since the 2009 National Strategy, the sector would annually demand today 8.2 billion artisanal bricks. For this volume, and assuming similar levels of per person productivity as in 2008/9, the sector would today employ 92,500 miners and generate UGX 2.08 billion or USD 707,200. However, we assume that the base selling price of UGX 150 or USD 0.05 per brick used in the 2009 study did not integrate the low-quality brick that sells for 50% discount and

[155] Hashemi & Cruickshank 2015
[156] Nyakairu et al. 2002
[157] 1,920.69 UGX to USD 0.65 source: oanda.com (2008/9 fiscal year average).
[158] UBOS 2010, (base 100 Jan-Mar 2006)
[159] UBOS 2016b
[160] This assumption was checked on the ground during the experts visit where the price of an artisanal brick was 250 UGX(150 UGX / 179 x 285 (August 16 index) = 250 UGX)
[161] MEMD 2009
[162] Average USD/UGX exchange rate for the Jan-Aug 2016 period. Source: Oanda.com
[163] UBOS 2016a

can represent 25–45% of the burnt bricks[164]. Using an average of 35%, it would have affected the selling price by 17.5%.

When corrected by the above factors, **the actual brick sector is employing and estimated 92,500 miners, generating 8.2 billion bricks for a value of UGX 1.716 trillion or USD 583 million and 1.9% of the 2015 GDP[165].**The comparison with ASGM is stark. An estimated 40,000 gold mine workers produce approximately 2 tonnes of gold per year valued at approximately USD 36 million. The value of artisanal and small-scale clay brick production, by comparison, is equivalent to 13.7 tonnes of gold.

A4.3.2. ASM Clay Brick Income and Distribution

Brick-making is usually performed by groups of three to eight workers, including a leader who is or is appointed by the financier. The production cycle is long. Once extracted, clay initially ferments for two to fourteen days, sometimes reworked with water, then left to ferment for an additional two to three1 days. Once the brick is manually formed and pre-dried for two to three days, it is stacked for drying for between a few weeks (in the dry season) and two months (during the rainy season). Following stacking of 5,000–15,000 bricks, the burning process lasts two to five days, followed by approximately four days of cooling.

The brick entrepreneur has to finance the three to nine weeks of production cycle before being able to sell the bricks. This capital need is the most important obstacle faced by entrepreneurs and constraint to miners seeking to share costs and benefits as a group. Lack of capital prevents them to optimise their income and revenues.

All artisanal brick production in Uganda is unlicensed (in part due to its exclusion in the current legal framework). This means that the government does not levy any direct tax, although local government is under considerable pressure to self-generate revenues needed to operate and some districts, sub-county, and village governments may impose levies, taxes, and fees. The only related tax identified was the tax on lorries. In Lumala site, the trucks transporting bricks pay UGX 15,000 (USD 5.1) per day to local authorities. A typical truck could load 2,000 bricks. Based on eight rounds per day per truck, the tax represents less than 1 shilling per brick, an insignificant amount, although cumulative revenues for local governments may be significant.

However, the indirect impact through spending and VAT generation should not be disregarded. If only one third of salaries and 20% of the owner's income were to be spend on VAT-taxed goods, 3% of these sales end in the state VAT-collected budget. Based on the estimated sector sales, this represents UGX 15 million or USD 5,100 per year.

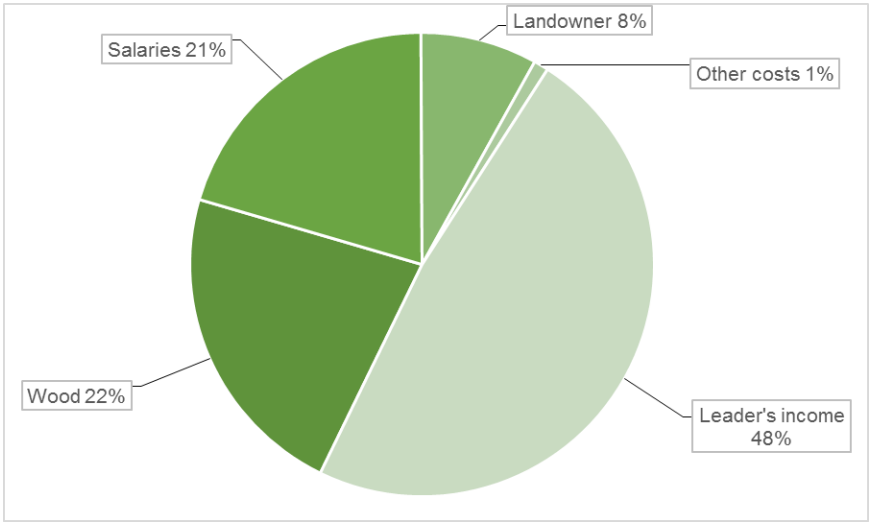
The value distribution was calculated based on the following variables:

- Worker salary: UGX 12,000 or USD 4.1 per day
- Working period: 6 days per week
- Yearly productivity: 89,000 bricks per year per worker
- Effective yearly working days: 267
- Wood consumption for burning: 1 tonne of wood for 5,000 bricks

Based on those variables, the following distribution has been calculated, as shown in Figure A27.

[164].World Bank & UNDP 1989
[165] FY 2014/15 GDP: USD 26.369 billion (World Bank 2016b)

Figure A27: ASM bricks, revenue distribution



A4.3.3. Social and Gender Dimensions of the Distribution of Costs and Benefits

The majority of clay extraction and brick production sites in Uganda are situated in peri-urban areas, in some cases surrounded by high density of residential housing. **The valleys where clay deposits are located provide a broad range of ecosystem services that can impact other land users.** These range from wetlands that buffer seasonal water fluctuations and passively treat wastewater and run-off from surrounding areas to forests used for fuel wood collection and temper local climate to water sourced from small rivers and streams. Conversely, **post-mining land uses can provide a means to mitigate population growth and related demands for land and economic opportunities**. This ranges from conversion of former clay mining areas to fish farms to cropland and, depending on water conditions, housing developments.

During operations, clay mining plays an even more significant role in local development. In Uganda's urban economies, employment rates of working age residents of poor households are exceptionally low (6.6%), thus ASM provides a much-needed opportunity. Furthermore, the majority of mine workers are area residents and their expenditures, cumulatively amounting to approximately USD 500 million per year, are spent locally, including on goods and services and on household educational and health care needs. Multiplier effects in the local economy vis-à-vis job creation and small enterprise development is undoubtedly significant.

Nevertheless, men disproportionately yield the greatest direct benefits from the clay subsector. Women participate at much lower levels than men (approximately 15%) and are less likely to have the financial resources needed to take on lucrative jobs as team leaders (only an estimated 10% of team leaders are women). Furthermore, women capture less of the revenue share from clay brick production because they are less likely than men to own and control over proceeds derived from land[166] and women's ownership of lorries and engagement in the wood trade is extremely uncommon. Given this and the distribution of revenues above, in terms of direct employment and economic benefits, **women may hold 15% of the jobs but yield only 8% of the economic benefits from the sector.**

Although indirect employment through injection of revenues into local economies can be significant, the solid brick supply chain is short. **Local economic and employment multiplier effects could be enhanced through emphasis on other products** that are more commonly sold in local shops, such as ventilation and facing bricks, clay pots, and clay stoves. Despite this, the relative demand, production volume, and value of these products are far below that of solid bricks. Nevertheless, women's participation in production and sales of these other products is believed to be much higher than that of solid bricks, potentially providing an area of focus for women's economic empowerment

[166] Only approximately 25–30% of land in Uganda is titled, of which women hold only 6% of titles. Under 'mailo' or customary land ownership, unless women are household heads, they are likely to have much less control over proceeds derived from land than men households heads (Ellis et al. 2005).

alongside targeted training efforts to increase their access to more lucrative jobs across the clay production and value chain.

A4.4. Key Conclusions from the Kampala Clay Case Study

Main conclusions from the Kampala clay case study are summarised as follows.

- **Uganda's clay subsector is the minerals sectors' most significant commodity by value.** Sales of bricks are estimated at approximately USD 500 million per year, almost ten times more than all other minerals officially produced in Uganda in 2015 (USD 57 million), including limestone, cobalt, gold, iron ore tin, and others[167]. Based on this, solid clay bricks from ASM constitute 1.8% of the GDP[168] and, given that most expenditures of ASM producers are local, represent a major catalyst for economic growth and development in the communities where they are produced. Although formal tax and royalty contributions are limited (including due to low formalisation rates), VAT contributions of ASM vis-à-vis expenditures made by miners and group leaders are roughly estimated at an additional USD 15 million per year.

- **ASM of clay and clay bricks is a major employer in peri-urban areas.** Urban unemployment rates are 8.0% (6.2% men; 9.9% women) while underemployment due to lack of skills, income or time accounts for an additional 27.4% of the working age population[169]. Clay extraction and brick production creates an estimated 92,500 much-needed jobs, mainly in urban and peri-urban households, where only 6.6% of working age occupants of poor households are employed[170].

- **Lack of bargaining power and informality of work arrangements results in low paying and insecure employment.** Group leaders (who are responsible for operating costs) earn approximately 48% of proceeds, while 21% is shared between mine workers. Long time frames (five to nine weeks) from commencement of production to sale of product provide an additional impediment. Lack of access to finance and low savings capacity, in particular as needed to purchase wood and rent land, requires reliance on a financier that, together with insecurity of employment, provides impediments to increased incomes for the working masses.

- **In terms of direct economic benefits, women hold approximately 15% of the jobs but obtain only approximately 8% of the economic benefits.** Team leaders or site owners, mainly men with the financial resources needed, yield the greatest benefits, but disparities in women's workforce participation and ownership and control of land also impacts the gender distribution of benefits. Women's participation (and benefits vis-à-vis spin-off employment) may be higher for non-solid brick products, such as ventilation and facing bricks, charcoal stoves, and pots for plants, which are typically sold off-site in local training centres. In addition to measures described below in solid brick production, this may provide an avenue to rectify gender inequalities in the distribution of benefits.

- **Children's participation in brick-making has been identified as a source of child labour** in the National Action Plan on Elimination of Worst Forms of Child Labour in Uganda (2012). Although occupational risks in clay production are typically less severe than other forms of ASM (e.g., gold, 3T), children are nevertheless more susceptible to physical risks and can experience additional development impacts associated with low participation in or early dropouts from school and psychosocial effects.

- **Environmental impacts on wetland and forest resources are significant.** On an annual basis, approximately 9 km^2 of land is degraded. Most of this is within wetlands that drain into Lake Victoria, plays critical roles in passive treatment of water from the densely populated greater Kampala region, and, as a sink, provides a buffer in times of water scarcity. Furthermore, approximately 6.7 million tonnes of wood resources are consumed annually, impacting approximately 400 km^2 per year of forests from which it was sourced.

[167] Based on 2015 production statistics (DGSM 2016).
[168] Based on GDP of USD 27.5 billion in 2015, www.data.worldbank.org/country/uganda
[169] UBOS 2015
[170] Ibid

- **Capacity building is critically needed to improve the production process and address and improve environmental, occupational and social outcomes.** Main areas of emphasis should relate to[171]:
  - **Improving the quality, product value, and increase profits through** improved clay selection skills based on intended end use and market; improved drying practices; wood management and mixing with cheaper organic waste products; and optimisation of kiln construction (dimensions, shape, insulation, airflow, heat distribution), including with an emphasis on energy efficiency. The potential for communal kilns in areas of high activity density could be explored.
  - **Preventing, minimising and mitigating environmental impacts by** introducing basis practices, such as side-casting and retaining cleared topsoil and vegetation for future reclamation and basic backfilling and/or re-contouring and re-vegetation; promoting different post-mining land use options, where appropriate given local conditions, such as transformation of abandoned pits into fish farms and re-vegetation and suitable crop planting on disturbed areas; creation of wetland corridors and water retention and management practices; reducing clay wastage (losses) in the production system; establishment of links with existing campaigns to finance and support tree planting would also help minimise or offset effects; and (as above) increasing energy efficiency and reducing consumption of wood by optimising kiln construction and introducing biomass alternatives (e.g., discarded maize husks) into the feed.
  - **Managing occupational risks by** basic training on risk identification, prevention, minimisation, and management; introducing basic site rules and practices concerning PPE, presence of non-workers on sites (including children) and basic codes of conduct; conducting sensitisation campaigns regarding malaria; and supporting financing for water pumps and (linked with environmental training), water and waste management, among others.
  - **Improving labour rights and conditions by** supporting organisational strengthening, including by introducing simple labour agreements and measures to increase gender-responsiveness, as well as those to increase transparency and more equitable cost- and benefit- sharing arrangements[172]
  - **Prioritising women's and youth participation and training, including within formalisation efforts to address inequalities,** including via leadership and advocacy training and business skills and entrepreneurship development, the latter of which may require support for basic literacy and numeracy.

- **Facilitate access to financing.** Given long production periods (five to nine weeks), financing is a major impediment for many operators and additional factor in relatively low earnings of the majority of workers. Furthermore, lack of capital is an additional constraint to both investment in improved methods (e.g., basic measures to increase energy efficiency and reduce under-fired bricks), thus reducing profitability, and introduction of safe practices (e.g., PPE) and post-mining land uses. Mining desks in banks serving nearby populations support for SACCOs and introduction of village savings and loans association models to miners groups should be explored. Given disparities in distribution of benefits, efforts should emphasise access to financing for women and youth (18–30 year olds), in particular.

[171] A series of technical recommendations for improved, safer, more environmentally responsible and socio-economically beneficial methods is provided in Hashemi & Cruickshank (2015), Hinton et al. 2008, and Practical Action Technical Briefs found at www.practicalaction.org.

[172] In this respect, an 'organisation' refers to a micro or small-scale enterprise, company, CBO, or cooperative. Different organisational structures may be more appropriate than others in different contexts, particularly when the significant financing needs and capacity are considered.