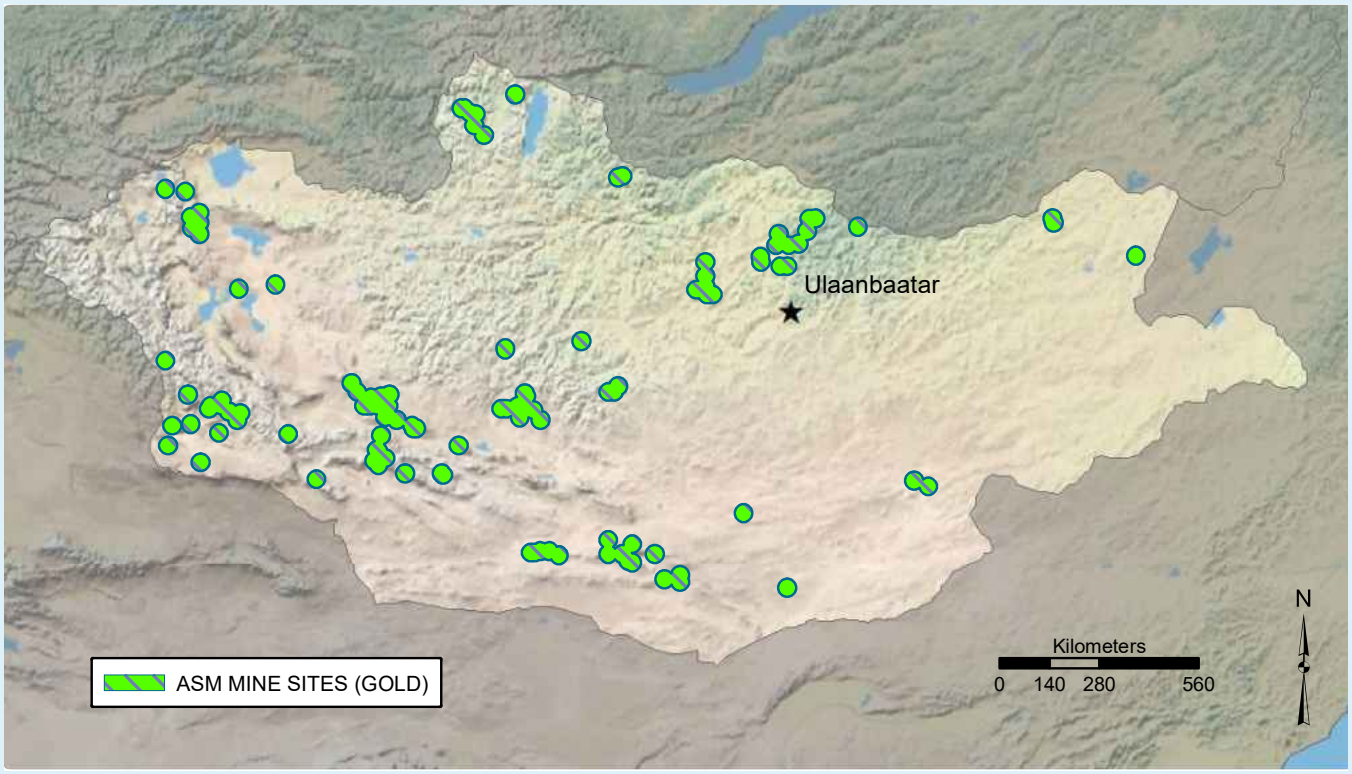
Mongolia

Author: Patience Singo

***Artisanal and Small-Scale Gold Mining Sites*[125]**



Materials mined by ASM

- Gold: 12.7 tons (2017)[126]
- Coal, fluorite, limestone, gemstones, and wolfram

[125]Map created by Daniel Stapper. Map data sources: Base map: US National Parks Service, 2017; NSO, 2017.
[126]Sustainable Artisanal Mining Project, 2018.

Mineral governance framework

Government priorities

- Review Law on Minerals and classify mining into artisanal, small, medium, and large-scale
- Improve ASGM contribution to the economy through Gold 2 Program till 2020
- One-stop-shop for ASGM trading in ASM dense areas
- Implementation of the Minamata Convention on Mercury

Laws and policy

- Law on Minerals 2006 (updated 2009,2010, 2014)
- Law on Land, clause 16.1.11
- Regulation on Extraction of Minerals from Small-Scale Mines, 2010 (amended 2017 to Government Resolution No. 151 of 2017)
- The State Policy on Mineral Resources Sector (2014–2025)
- The Government Action plan 2016–2020

Government institutions

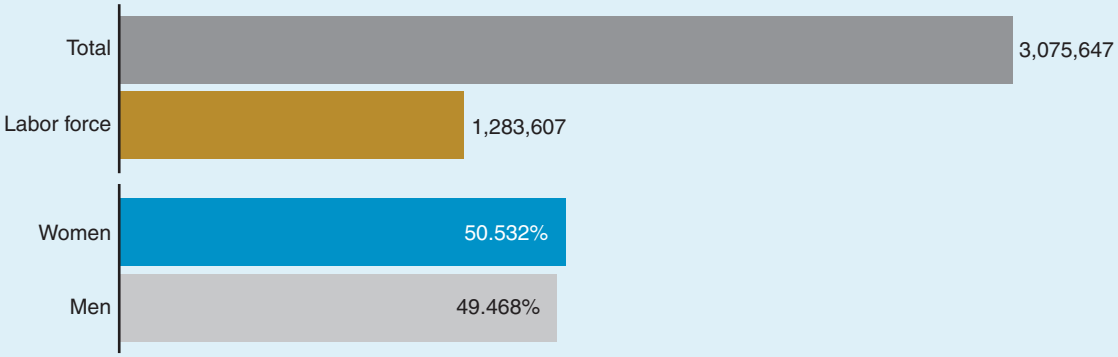
- Ministry of Mining and Heavy Industry
- Minerals Resources and Petroleum Authority (MRPAM)
- Assay Office
- Local Governments
- Bank of Mongolia

Associations and member organizations

- Mongolia National Federation of Artisanal Miners (MNFA)
- Regional ASM Federations
- Various local ASM associations and NGOs such as the Mongolian National Mining Association

Economic and development data

2017 Population[127]



2017 Classification (GNI per capita)[128]

- Lower-middle-income: USD 3,290

2017 Gross Domestic Product[129]

- USD 11.488 Billion

2016 Poverty headcount ratio (2011 purchasing power parity)[130]

- Population on/below national poverty line (2014): 21.6%
- Population living on <USD 1.90 per day: 0.5%
- Population living on <USD 5.50 per day: 8.1%

Livelihoods

Employment (2016)[131]

- ASM: 60,000 directly, 240,000 indirectly
- LSM: 38,200 directly
- ASM permits granted: 113
- ASM informality estimate: 80% informal

Gender participation in ASM (2016)[132]

- Women: 24%
- Men: 76%

[127]World Bank, 2017b.
[128]Ibid.
[129]Ibid.
[130]Ibid.
[131]SDC, 2015; NSO, 2016, 2017.
[132]NSO, 2016, 2017.

FIGURE 3 ANNUAL GOLD SOLD IN TONS TO BANK OF MONGOLIA FROM ENTITIES VERSUS INDIVIDUALS (ASM) 2006–2017[133]

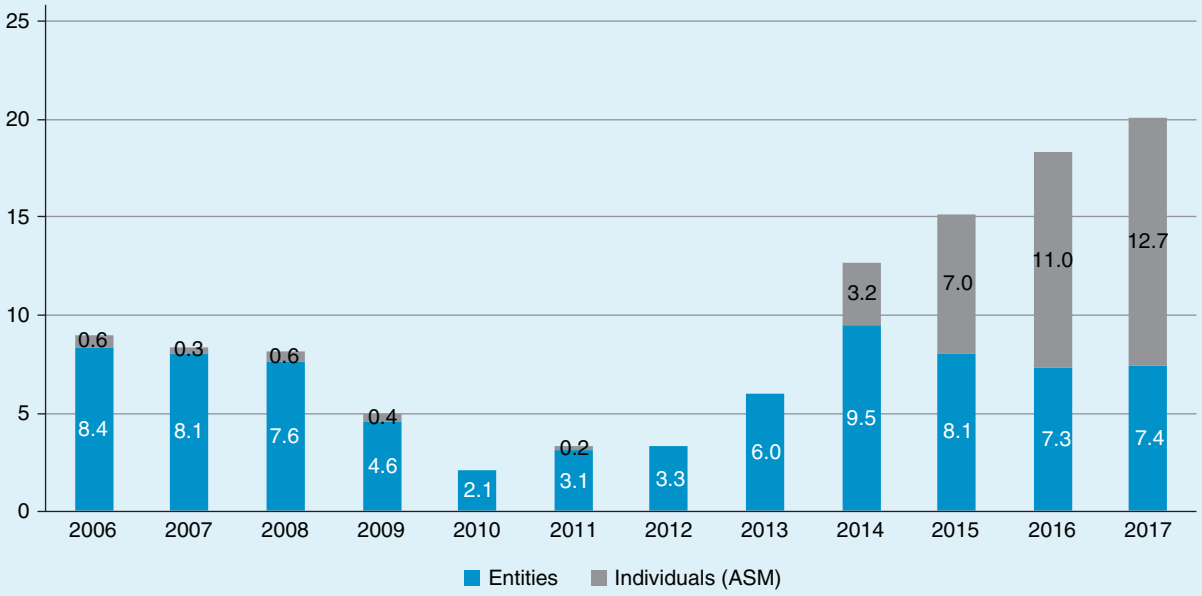
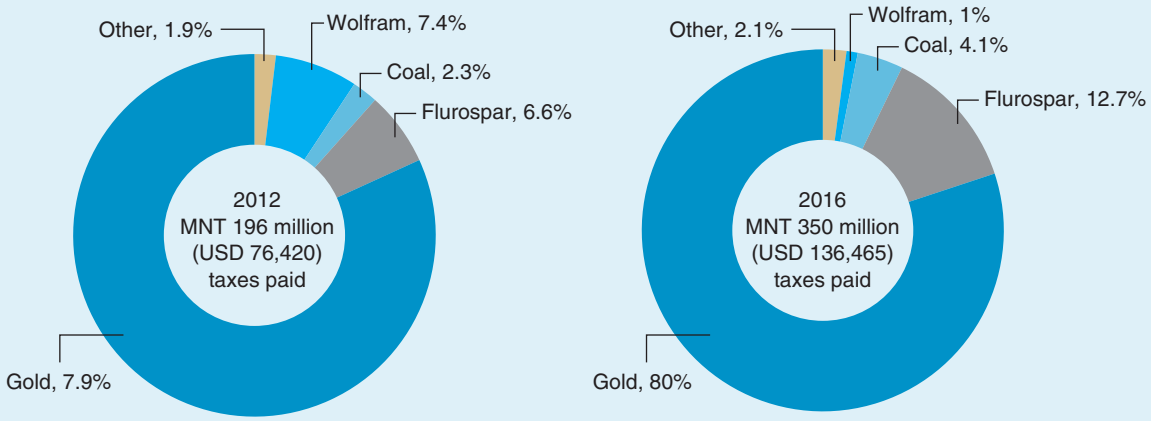


FIGURE 4 TAX PAID BY SMALL-SCALE MINERS IN MONGOLIA, 2012 VS. 2016 (MNT)[134]



[133]Bank of Mongolia, 2018.

[134]Reproduced from the original source. Note that in the original source there are no units given for the 196 and 350 million figures. However, these are confirmed to be reported in Mongolian Tugrik (MNT 1 = USD 0.0003899). This highlights issues of data quality being reported. Furthermore, the tax figures are based on a survey, as opposed to data from official state institutions, again effecting reliability. Source: NSO, 2016.

Mining sector summary

Mongolia's mining sector is dominated by the large-scale extraction of coal, copper, fluorite, gold, and iron ore. The country has the world's second largest copper reserves[135] and was the sixth top fluorite producer in 2017.[136] Gold is the main commodity mined on an artisanal and small-scale, accounting for approximately 50% of annual national production and 75% of the sector's workforce, followed by fluorite and coal in almost equal shares (10% and 9.5% of ASM activities, respectively).[137] Smaller quantities of limestone, gemstones, and wolfram are also produced through ASM, engaging 5.5% of the sector's workforce, while the production of development minerals can be found near city and provincial centers.

With regard to the availability and reliability of detailed data on ASM, Mongolia has made what can be considered some of the greatest strides in recent years. For the purpose of this report and the wider Delve initiative, Mongolia serves as a "best case" example, having carried out a nationwide survey on ASM to establish a baseline in 2012, which was repeated again in 2016. This country profile demonstrates what can be achieved through a continued and concerted effort to undertake a rigorous countrywide baseline and gather detailed data on the sector and acts somewhat as a gold standard for other countries and programs to follow suit. Yet, it also illustrates the challenges with effectively using large amounts of data.

Mineral governance framework

The mineral governance framework for ASM in Mongolia is based on a number of key legal instruments and policies, many of which have been updated in recent years. These include:

- Law on Minerals, 2006, governs the exploration and mining relations of all types of mineral resources, except water, oil, natural gas, and radioactive and common minerals. Several clauses have since been updated in 2009, 2010, and 2014. The law includes a definition of small-scale mining; outlines requirements for license holders, mineral exploration, and mining operations; and explains the roles of the national government entities responsible for geology and mining. These are (1) Ministry of Mining and Heavy Industry, and (2) the Minerals Resources and Petroleum Authority of Mongolia (MRPAM). The law also outlines the role of "authorities of local administration and self-government bodies;" and prescribes royalties and penalties for violations.[138]
- Law on Land, 2002, outlines different types of land that are considered "Land for State special needs." Clause 16.1.10, which was added in July 2010, includes "Land allocated for small-scale mining purposes." Land access is through permits granted by the local authority or through a tripartite agreement with a permit holder, the local government, and ASM partnerships.
- Regulation on Extraction of Minerals from Small-Scale Mines, 2010 (Government Resolution No. 308), outlines practical regulations with respect to ASM. Specifically, it outlines the roles and responsibilities of national and district level (*soum*) government with respect to processing small-scale mining permits and land allocation, maintaining a cartographic registry, supporting miners, and supervising and inspecting operations to ensure adherence to occupational, safety, and environmental standards and permits. The regulation also details legal requirements of license holders.
- Government Resolution No. 151 of 2017[139] replaces the 2010 Regulation on Extraction of Minerals from Small-Scale Mines (above) and improves the coordination of ASM interventions and formalization activities by establishing an intergovernmental ASM council and strengthening the roles and responsibilities of provincial (*aimag*) governments. It also increases equipment capacity limitations on mining activities and extends the term of ASM agreements until the resources are totally exhausted, and formalizes the Frugal Rehabilitation Methodology for miners to use in environmental rehabilitation.

[135]SES Professionals, 2018.
[136]World Atlas, 2017.
[137]NSO, 2017.
[138]Law of Mongolia, 2006.
[139]Government of Mongolia, 2017.

- The State Policy on Mineral Resources Sector (2014-2025) articulates the medium-term strategy for ASM management and development and commits to improving the legal framework and upgrading of the sector.
- The Government Action Plan (2016-2020) aims to advance formalization efforts and increase gold production through regional assaying and buying centers, which are being established in areas of high ASM activity.[140]
- Mongolia is also a signatory to the Minamata Convention on Mercury, which it ratified in 2016, and is currently developing a National Action Plan on ASM.

In terms of licensing, prospective miners must be Mongolian nationals over age 18 years and be a resident in the province or city where the mineral deposits they seek to exploit are located. The process is decentralized through local government, and permits are awarded on a first come first served basis by the local authority. The MRPAM verifies all ASM permit requests against a database of existing mining and exploration areas and issues a mining permit valid for one year if there are no activities already under way in that location. Permits are renewable upon satisfaction of statutory obligations, such as rehabilitation, payment of local taxes, and evidence of the potential for further exploitation. There is no additional permission to access land above ground as ASM land is selected from local government "special use land."

Crucially, the Mongolian mineral governance framework recognizes the wide variety of ASM operations and their degree of formality. This is beneficial to formalization efforts because it makes obtaining a permit, entry into the formal economy, and, therefore, subsequent access to support services far easier than in many other countries. The three main types of operations that are recognized include unregistered partnerships, cooperatives, and registered partnerships, the latter two of which are considered to be more developed, mechanized, and technologically advanced, and which are supported to access bank loans.

The MRPAM also fulfils a number of technical responsibilities, ranging from: providing training, assistance, and general support to miners, to undertaking surveys and geological mapping, to developing and maintaining a mining cadastre, and identifying and delineating areas suitable for ASM. However, to date, progress in this regard has been slow because the agency has limited resources to undertake such exercises. Perhaps the most important technical role that the MRPAM performs, especially in relation to Delve, is the collection of detailed data on the sector and the maintenance of an ASM database, which was created in 2013 through the Sustainable Artisanal Mining Project with the support of the SDC.[141] As mandated by the Regulation on Extraction of Minerals from Small-Scale Mines, the database is populated annually by data that local government authorities must collect and report, including organizational data on location and numbers of miners, member details, and equipment; economic data on production, income, tax paid, exports, and sales; social data on health, livelihoods, communication tools, and safety and accidents; and environmental data on land degradation and rehabilitation. In 2012, the National Statistics Office of Mongolia (NSO) carried out the first nationwide survey to establish a baseline in this regard and populate the database and repeated the survey in 2016, enabling a comparison over the four-year period. Part of the survey is accessible online through the ASM Knowledge Hub platform, which allows a detailed view of the data by province and county. As a best practice, the 2012 survey data was translated into an ASM Atlas, and published in print and online in both Mongolian and English language, for monitoring and policy advocacy.

In addition to the significant improvements made in data collection, Mongolia has implemented a series of measures to mitigate adverse impacts of ASM operations on the environment. Statistics show a decrease of ASM-destroyed land and an increase in ASM-rehabilitated lands between 2012 and 2016. Also, the use of mercury in gold processing has been largely abandoned due to the establishment of mercury-free processing plants in five key provinces and since the introduction of the Frugal Rehabilitation Methodology, as per the 2017 regulation. However, despite the concerted effort in recent years to improve

[140]MRPAM, 2016.
[141]ASM Knowledge Hub, 2018.

the mineral governance framework and data collection and availability on the sector, there is still a need to harness this information to translate it into effective policy making. Although more than 72 ASM associations and NGOs have been created in recent years, an estimated 80% of miners remain informal and lack technical support and investment. Furthermore, a major limitation of the nationwide surveys is that they covered only about 15-20% of miners in the country. Meanwhile, there is also significant variation in the quality, type, and methods used by different government agencies[142] to collect the wide variety of ASM data on an ongoing basis, and there is no integrated platform to bring this information together. As such, there is still a need for a more comprehensive, sector-wide approach for collecting and collating ASM data in one place and for using it for effective policy making.

Economy

Mongolia's economy and foreign exchange earnings depend significantly on the mining sector, particularly coal, copper, fluorite, gold, and iron ore. In 2017, the Bank of Mongolia reported that merchandise exports were valued at USD 6,201 million. Of this total, mining contributed USD 5,519 million (89%), with gold making up USD 595 million and comprising 9.6% of overall exports.[143] Of the gold production sold to the Bank of Mongolia in 2017 (Figure 3), ASM produced 12.7 tons (63%).[144] While there is good data on mineral production and exports from the Customs Office and the NSO, aside from gold, none of the other commodities are disaggregated between ASM and large-scale operations, thus poorly accounting for ASM's contribution to annual mineral production. However, some of the artisanal and small-scale gold mining (ASGM) production is assumed to be declared by medium-sized companies to avoid paying high income tax (see Figure 4), demonstrating challenges with robust data collection.

There are a number of very useful statistics and data being collected in Mongolia that helps to paint a picture of its significant economic potential. In terms of gross revenue generated by ASM, the 2016 NSO survey reports that ASM generated 22 billion MNT (USD 9.2 million). This was a decrease compared to gross revenues of MNT 25.4 billion (USD 18.1 million) in 2012. However, these figures only include data from around 20% of the ASM population, thereby significantly underestimating the vast value and potential of the sector for economic growth and development. Another interesting statistic collected by the NSO is investment in things such as buildings, vehicles, equipment, and personal assets. In 2016, ASM invested a total of MNT 1.5 billion (USD 625,000), compared to MNT 2.1 billion (USD 1.5 million) in 2012.[145] A 2015 SDC study covering 10 counties estimated ASM's direct monthly contribution to the local economy to be MNT 8 billion (USD 4 million), indirect monthly contribution to be MNT 1.5 billion (USD 750,000), and the economic multiplier to be 1.189. Combined, these data provide a glimpse of enormous economic potential that the sector has in terms of its contribution to GDP, investment and taxation, and linkages to other economic activities. However, without data that cover the whole country or even a truly representative sample, desegregate between ASM and LSM, or are regularly shared and reported, knowledge on the exact contribution of ASM to the economy will remain limited.

Livelihoods

An estimated 60,000 people directly engage in ASM in Mongolia, and approximately 240,000 are dependent on the sector for their livelihood.[146] To compare and contextualize the livelihood contribution of ASM, in 2016 LSM employed 38,200 people, meaning that ASM directly employed almost twice the number of individuals, most of whom do not have professions or tertiary qualifications.[147] In terms of geographical spread, ASM activities occur in 19 of 21 provinces, making it an important livelihood activity across the country. According to the NSO 2016 data, ASM provides 11.1% of miners with permanent

[142]Major ASM data providers include the local government, MRPAM, Ministry of Labour, General Social Insurance Office, Assay Office, Bank of Mongolia, ASM associations, and the National Federation of Artisanal Miners.
[143]Bank of Mongolia, 2017.
[144]Sustainable Artisanal Mining Project, 2018.
[145]NSO, 2017.
[146]SDC, 2015.
[147]NSO, 2017.

employment and 68.3% with regular income. Yet, while surveys such as these have been carried out in an attempt to establish a baseline of the sector's livelihood dimensions, due to a lack of registration of miners and widespread informality, the true value and extent of the contribution of ASM to local wealth and job creation are not well quantified. Furthermore, the wide variety of ASM-supported activities means that the surveys carried out to date have not been able to fully capture the full extent of the sector's livelihood dimensions.

Key data needs

Rather than a lack of data, the challenge in Mongolia is ensuring that the large amount of data being generated by various national-, provincial-, and district-level government agencies is accurate, reliable, and comparable and that it is collated in one accessible place so it can be used in an effective and manageable way to inform policy making.

- Develop standardized methods of data collection and harmonize reporting across government agencies and institutions
- Enhance and harmonize the existing ASM Knowledge Hub and various mining databases into one platform to collate, consolidate, present, and allow side-by-side comparison of economic and social data sets, with reliable inputs authorized by government sources
- Extend the nationwide surveys to capture a greater proportion of ASM activities, which are currently based on research conducted with 13,000 of the 60,000 miners estimated to operate in the country
- Collect accurate data that are disaggregated by ASM and LSM, different commodities (especially coal and fluorite), gender, and direct and indirect employment
- Collect geological data that quantify the location and value of deposits for ASM activities and zones to enable small-scale operators

References

ACP-EU Development Minerals Programme. 2018. *Development Minerals in Fiji*. Available at http://www.developmentminerals.org/index.php/en/countries/fiji

Affam, M., and Asamoah, D.N. 2011. Economic Potential of Salt Mining in Ghana Towards Oil Find. *Research Journal of Environmental and Earth Sciences* 3(5): 448-456.

Afghanistan Geological Survey. 2016. *Gemstones of Afghanistan*. Kabul: Afghanistan Geological Survey.

African Minerals Development Centre (AMDC). 2015. *African women in artisanal and small-scale mining*. African Union.

African Union. 2009. *Africa Mining Vision*. Available at http://www.africaminingvision.org/amv_resources/AMV/Africa_Mining_Vision_English.pdf

Aich, P. 1996. Gender issues in mining: Effects of retrenchment. In A. Ghose (ed.), *Small/medium scale mining: A global perspective*. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.

Amankwah, R. 2015. *Map of Ghana mineral deposits*. Presentation at Inception Workshop for the ratification and early implementation of the Minamata Convention on Mercury Project in the Republic of Ghana, Accra, 22 October 2015.

Appleton, J. D., Williams, T. M., Orbea, H., and Carrasco, M. 2001. Fluvial contamination associated with artisanal gold mining in the Ponce Enríquez, Portovelo-Zaruma and Nambija areas, Ecuador. *Water, Air, and Soil Pollution* 131(1-4): 19-39.

ARM. 2013. *Fairmined Standard for Gold from Artisanal and Small-Scale Mining, Including Associated Precious Metals. Version 1.1/ARM—01 May 2013*.

Aryee, B., Ntibery, B., and Atorkui, E. 2003. Trends in the small-scale mining of precious minerals in Ghana: a perspective on its environmental impact. *Journal of Cleaner Production* 11(2): 131-140.

ASM18. 2018. *Mosi-ao-Tunya Declaration on Artisanal and Small-scale Mining, Quarrying and Development*. Annex 1, Report of the International Conference on Artisanal and Small-scale Mining & Quarrying 11-13 September, 2018, Livingstone, Zambia. Available at http://asmconference.org/pdf/Mosi-oa-Tunya_Declaration_EN.pdf

ASM Knowledge Hub. 2018. https://www.asmhub.mn/en/home

ASM Knowledge Sharing Archive. 2018. *ASM Inventory, World Map of Artisanal and Small-scale Mining: ASM Population*. Available at http://artisanalmining.org/Inventory/

Ayhuan, D., Atteng, O., Dondokambey, A., and Randuk, M. 2003. Mercury pollution on district of Dimembe river system, North Sulawesi, Indonesia, due to traditional gold mining activities. *Journal De Physique IV* 107: 79-82.

Bank of Ghana. 2017. *Annual Report 2016*. Available at https://www.bog.gov.gh/component/content/article/102-annual-reports/3108-annual-report-2016

——. 2018. *Annual Report 2017*. Available at https://www.bog.gov.gh/component/content/article/102-annual-reports/3654-annual-report-2017

Bank of Guyana. 2017. *Annual Report 2017*. Available at https://www.bankofguyana.org.gy/bog/images/research/Reports/ANNREP2017.pdf

Bank of Mongolia. 2017. *The Bank of Mongolia Annual Report*. Available at https://www.mongolbank.mn/documents/annualreport/2017e.pdf

Barreto, M., Schein. P., Hinton, J., and Hruschka, F. 2018. *Economic Contributions of Artisanal and Small-Scale Mining in Rwanda: Tin, Tantalum, and Tungsten*. East Africa Research Fund: Pact and ARM.

Barry, M. (ed.). 1996. *Regularizing Informal Mining. A Summary of the Proceedings of the International Roundtable on Artisanal Mining. Organized by the World Bank, 17-19, May 1995*. Industry and Energy Department Occasional Paper No. 6.

Bose-O'Reilly, S., Bernaudat, L., Siebert, U., Roider, G., Nowak, D., and Drasch, G. 2017. Signs and symptoms of Mercury-exposed gold miners. International Journal of Occupational Medicine and Environmental Health, 30 (2), pp. 249-269.

Bowersox, G. W. 1985. A Status Report on Gemstones from Afghanistan. *Gems & Gemology* 21(4): 192-204.

——. 1996. *Gemstones of Afghanistan*. USA: Geoscience Press.

Bulkan, J., and Palmer, J. 2016. Rentier nation: Landlordism, patronage and power in Guyana's gold mining sector. *The Extractive Industries and Society* 3(3): 676-689.

Buxton, A. 2013. *Responding to the challenge of artisanal and small-scale mining. How can knowledge networks help?* London: IIED.

Carman, J. 1985.The Contribution of Small-Scale Mining to World Mineral Production. *Natural Resources Forum* 9(2): 119-124.

Carman, J., and Berger, A.R. 1990. Small-scale mining: a general review. I*n Small-Scale Mining: A Guide to Appropriate Equipment* (eds. J.F. McDivitt, et al.). London: Intermediate Technology and Development Group.

Centre of Science and Environment. 2008. *Rich Lands Poor People: Is 'Sustainable' Mining Possible?* New Delhi: Centre of Science and Environment.

——. 2018. *India Map of Minerals.* Available at www.cse.org

Chakravorty, S. L. 1994. *Role of small-scale mining in national economy*. Training course hosted by the Central Mining Research Institute and the National Institute of Small Mines, Calcutta, 1-5 August 1994.

——. 2001. *Artisanal and Small-scale Mining in India*. London: Mining, Minerals and Sustainable Development Project, IIED.

Charlet, L., Roman-Ross, G., Spadini, L., and Rumbach, G. 2003. Solid and aqueous mercury in remote river sediments (Litany River, French Guyana, South America). *Journal De Physique IV JP* 107(I): 281-284.

China Statistical Yearbook. 2017. *Industry, Brief Introduction, Main Indicators of Industrial Enterprises above Designated Size*. Accessed at http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm

Chowdhury, R. A., and Lahiri-Dutt, K. 2016. The geophagous peasants of Kalahandi: De-peasantisation and artisanal mining of coloured gemstones in India. *Extractive Industries and Society* 3(3): 703-715.

Chuhan-Pole, P., Dabalen, A., Kotsadam, A., Sanoh, A., and Tolonen, A. 2015. The Local Socioeconomic Effects of Gold Mining, Evidence from Ghana. Policy and Research Working Paper 7250. Africa Region: World Bank Group.

Clifford, M. J. 2011. Pork Knocking in the land of many waters: Artisanal and small-scale mining (ASM) in Guyana. *Resources Policy* 36: 345-362.

Clifford, M. J. 2015. Future strategies for tackling mercury pollution in the artisanal gold mining sector: Making the Minamata Convention work. Futures 62(A): 106-112.

Cooperative Republic of Guyana. 2017. *The Journey to the Good Life Continues: Budget 27th November, 2017.* Sessional Paper No. 1 of 2017. Available at http://www.guyana.org/Budget-Speech-2018.pdf

Corbett, T., O'Faircheallaigh, C., and Regan, A. 2017. 'Designated areas' and the regulation of artisanal and small-scale mining. *Land Use Policy* 68: 393-401.

Crawford, G., and Botchwey, G. 2016. *Conflict, collusion and corruption in small-scale gold mining in Ghana: Chinese miners and the state*. International Institute of Social Studies, The Hague.

Crispin, G. 2003. Environmental management in small scale mining in PNG. *Journal of Cleaner Production* 11(2): 175-183.

Davidson, J. 1990. *Gold mining and garimpeiros*. Montreal: Small Mining International Bulletin.

De Lacerda, L. D., Pfeiffer, W. C., Ott, A. T., and Da Silveira, E. G. 1989. Mercury contamination in the Madeira River, Amazon—Hg inputs to the environment. *Biotropica* 21(1): 91-93.

Deb, M., Tiwari, G., and Lahiri-Dutt, K. 2008. Artisanal and small scale mining in India: selected studies and an overview of the issues. *International Journal of Mining, Reclamation and Environment* 22(3): 194-209.

Defensoría del Pueblo. 2014. *Balance de la gestión estatal frente a la minería informal e ilegal en el Perú 2012-2014. Supervisión a las entidades de alcance nacional y regional.* Available at https://www.scribd.com/document/253221294/Balance-de-la-gestion-estatal-frente-a-la-mineria-informal-e-ilegal-en-el-Peru-2012-2014-Supervision-a-las-entidades-de-alcance-nacional-y-regional

Delve. 2019. *Home*. The World Bank and Pact. Available at https://www.delvedatabase.org/

Divya, C. M., Divya, S. Ratheesh, K., and Volga, R. 2012. *Environmental Issues in Stone Crushers*. Available at https://businessimpactenvironment.wordpress.com/2012/01/08/environmental-issues-in-stone-crushers/

DLA Piper. 2012. *Mining in Africa: A Legal Overview*.

Drasch, G., Böse-O'Reilly, S., Beinhoff, C., Roider, G., and Maydl, S. 2001. The Mt. Diwata study on the Philippines 1999—Assessing mercury intoxication of the population by small scale gold mining. *Science of the Total Environment* 267 (1-3): 151-168.

Eftimie, A., Heller, K., Strongman, J., Hinton, J., Lahiri-Dutt, K., and Mutemeri, N. 2012. *Gender dimensions of artisanal and small-scale mining: A Rapid Assessment Toolkit.* Washington, D.C., USA: The World Bank.

EITI. 2018. *The global standard for the good governance of oil, gas and mineral resources* (website homepage). Available at https://eiti.org/

Elmes, A. Ipanaqué, J., Rogan, J., Cuba, N., and Bebbington, A. 2014. Mapping licit and illicit mining activity in the Madre de Dios region of Peru. *Remote Sensing Letters* 5(10): 882-891.

European Union. 2017. Regulation 2017/821 of the European Parliament and the Council of 17 May 2017 laying down supply chain due diligence obligations for European importers of tin, tantalum, and tungsten, their ores, and gold originating from conflict affected and high-risk areas.

EY Peru. 2017. *Peru's Mining and Metals Investment Guide 2017-18*. Available at http://www.bergbau-peru.com/fileadmin/ahk_peru_bergbau/PDF/EY-Peru-mining-metals-investment-guide_2017-2018.pdf

Fairtrade International. 2013. *Fairtrade Standard for Gold and Associated Precious Metals for Artisanal and Small-Scale Mining* (version 08.11.2013_v1.2).

Federation of Indian Chambers of Commerce & Industry (FICCI). 2013. *Development of Indian Mining; The way forward*. New Delhi: FICCI.

Financial Chronicle. 2017. *Unique challenges faced by the Indian Mining Industry.* Available at https://www.pressreader.com/india/financial-chronicle/20170915/281814284031864

Fleming, D. A., and Measham, T. G. 2014. Local job multipliers of mining. *Resources Policy* 41: 9-15.

Franks, D. M. 2017. *Reconsidering the role of minerals and matter in international development*. Bryan Lovell Meeting 2017: Mining for the Future. pp. 22-23. London: The Geological Society. Available at https://www.geolsoc.org.uk/~/media/shared/documents/Events/2017/BL17%20abstract%20book.pdf

Franks, D. M., Pakoun, L., and Ngonze, C. 2016. *Development Minerals: Transforming a neglected sector in Africa, the Caribbean and the Pacific*. New York, NY, USA: United Nations Development Programme.

Gardner, E. 2012. Peru Battles the Golden Curse of Madre de Dios. *Nature* 486(7403): 306-307.

GeoNode. 2018. *Guyana Map Layers*. Available at http://www.geoserver.ggmc.gov.gy/

GGB. 2018. *Guyana Gold Board.* Available at https://www.nre.gov.gy/guyana-gold-board/

Ghose, A. K. (ed.) 1994a. Small-Scale Mining: A Global Overview. Proceedings of International Conference on Small-Scale Mining, organized by Mining, Geological and Metallurgical Institute of India at Calcutta from 3 to 4 October, 1991. New Delhi: Mining, Geological, and Metallurgical Institute of India, Calcutta, and Oxford & IBH Pub.

——. 1994b. New Configuration of Small-scale Mining for Developing Countries, pp. 29-44, in Ghose, A. K. (ed.) Small-Scale Mining: A Global Overview. Proceedings of International Conference on Small-Scale Mining, organized by Mining, Geological and Metallurgical Institute of India at Calcutta from 3 to 4 October, 1991. New Delhi: Mining, Geological, and Metallurgical Institute of India, Calcutta, and Oxford & IBH Pub.

Global Environment Facility. 2018. *Making Mercury History in the Artisanal & Small-Scale Gold Mining Sector*. Available at www.thegef.org/news/making-mercury-history-artisanal-small-scale-gold-mining-sector

Global Initiative Against Transnational Organised Crime. 2017. *Case Study: Illicit Gold Mining in Peru*. Available at http://globalinitiative.net/wp-content/uploads/2017/11/tgiatoc-case-study-peru-1878-web-lo-res.pdf

Gonzalez, D. 2016. *Opportunities, not oppression, to stop illegal mining in the Peruvian Amazon.* Available at https://yaleglobal.yale.edu/content/opportunities-not-oppression-stop-illegal-mining-peruvian-amazon

Government of Guyana. 2012. A Mining Information Toolkit for Guyana. Her Majesty the Queen in Right of Canada.

Government of Mongolia. 2017. *Government Resolution of Mongolia, 151.* Available at https://asmhub.mn/uploads/files/the-government-order-151-eng.pdf

Guenther, M. 2018. *Local Effects of Artisanal Mining: Empirical Evidence from Ghana*. Conference Paper. Available at https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=JRsympRES&paper_id=217

Gunasekaran, S. 2014. Debt Bondage in the Sandstone Quarries of Rajasthan. *Economic and Political Weekly* 49(30).

Gunson, A. J., and Jian, Y. 2001. *Artisanal Mining in The People's Republic of China.* Working Paper 74. London: MMSD, IIED, and World Business Council.

Guyana Bureau of Statistics. 2017. *Bureau of Statistics Trade Statistics System January-December, 2017 (Provisional)*. Available at http://www.statisticsguyana.gov.gy/pubs/Trade2017.pdf

Guyana Ministry of Natural Resources. 2018. Guyana Ministry of Natural Resources. Available at https://www.nre.gov.gy/mining/

Hentschel, T., Hrushka, F., and Priester, M. 2002. *Global Report on Artisanal and Small-scale Mining*. London: MMSD and IIED.

——. 2003. *Artisanal and Small-Scale Mining, Challenges and Opportunities*. London: IIED and World Business Council for Sustainable Development.

Hilson, G. 2001. *A Contextual Review of the Ghanaian Small-scale Mining Industry*. London: MMSD and IIED.

——. 2002. Small-scale mining and its socioeconomic impact in developing countries. *Natural Resources Forum* 26(1): 3-13.

——. 2007. What is wrong with the global support facility for small-scale mining? *Progress in Development Studies* 7(3): 235-249.

——. 2016. Development Minerals in Africa, the Caribbean and the Pacific: Background Study. In Franks, D. M., Pakoun, L., and Ngonze, C. (eds.), *Development Minerals in Africa, the Caribbean and the Pacific*. Brussels: ACP-EU Development Minerals Programme and UNDP. Available at http://www.developmentminerals.org/images/pdf/Background-Study_EN.pdf

——. 2017. Shootings and Burning Excavators: Some rapid reflections on the Government of Ghana's handling of the informal Galamsey 'mining menace'. *Resources Policy* 54: 109-116.

——. n.d. Why is there a large-scale mining 'bias' in sub-Saharan Africa? *Land Use Policy*, in press, corrected proof. Available at https://doi.org/10.1016/j.landusepol.2017.02.013

Hilson, G., Hilson, A., and Maconachie, R. 2017a. Opportunity or necessity? Conceptualizing entrepreneurship at African small-scale mines. *Technological Forecasting and Social Change* 131: 286-302.

Hilson, G., Hilson, A., Maconachie, R., McQuilken, J., and Goumandakoye, H. 2017b. Artisanal and Small-Scale Mining (ASM) in sub-Saharan Africa: Re-conceptualizing Formalization and 'Illegal' Activity'. *Geoforum* 83: 80-90.

Hilson, G., Hilson, A., and McQuilken, J. 2016. Ethical minerals: Fairer trade for whom? *Resources Policy* 491: 232-247.

Hilson, G., Hilson, A., Siwale, A., and Maconachie, R. 2018. Female faces in informal 'spaces': Women and artisanal and small-scale mining in sub-Saharan Africa. Africa Journal of Management 4(3): 306-346. *Under review*.

Hilson, G., and McQuilken, J. 2014. Four decades of support for artisanal and small-scale mining in sub-Saharan Africa: A critical review. *The Extractive Industries and Society* 1(1): 104-118.

——. 2016. Moving overseas? Critical reflections on the implementation of Latin American ethical gold schemes in sub-Saharan Africa. In *Mining in Latin America: Critical Approaches to the New Extraction*. Routledge Studies of the Extractive Industries and Sustainable Development.

Hilson, G., and Okoh, G. 2013. Artisanal and Small-Scale Mining in Ghana: Institutional Arrangements, Resource Flows and Poverty Alleviation. In B. Campbell (ed.), *Modes of Governance and Revenue Flows in African Mining*. Basingstoke, U.K.: Palgrave Macmillan.

Hinton, J. 2009. Small Scale Mining Handbook. A Guidebook for Improving the Performance of Artisanal and Small Scale Mining in Uganda. SMMRP. Entebbe: Uganda.

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

Hinton, J., Lyster, O., Katusiime, J., Nanteza, M., Naulo, G., Rolfe, A., Kombo, F., Grundel, H., MacLeod, K., Kyarisiima, H., Pakoun, L., Ngonze, C., and Franks, D. M. 2018. Baseline Assessment of Development Minerals in Uganda Volume 1. In D. M. Franks, L. Pakoun, and C. Ngonze (eds.), *Development Minerals in Africa, the Caribbean and the Pacific*. Kampala, Uganda: ACP-EU Development Minerals Programme

and UNDP. Available at http://www.ug.undp.org/content/dam/uganda/docs/UNDPUg18%20-%20Dev MinBaseLineUganda_Vol.1.pdf

Hinton, J., Veiga, M., and Beinhoff, C. 2003. Women and Artisanal Mining: gender Gender Roles and the Road Ahead. In G. Hilson (ed.), *The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries*. Netherlands: A.A. Balkema, Swets Publishers.

Hruschka, F. 2018, November 22. Personal communication and feedback following review of an earlier version of this report.

Htwe, C. M. 2018, July 16. Foreign investment permitted in mining sector under new govt regulations. *Myanmar Times*. Available at https://www.mmtimes.com/news/foreign-investment-permitted-mining-sector-under-new-govt-regulations.html

IBM. 2015-16. *Indian Mineral Industry at a glance.* Nagpur: IBM.

——. 2015-16. *Annual Report of Indian Bureau of Mines,* Nagpur: Government of India, Mininstry of Mines.

IGF. 2017. *Global Trends in Artisanal and Small-Scale Mining (ASM): A review of key numbers and issues*. Winnipeg: International Institute for Sustainable Development.

IISD. 2017. *Mining Policy Framework Assessment: Mongolia.* Available at https://www.iisd.org/library/igf-mining-policy-framework-assessment-mongolia

ILO. n.d. *Facts on Small-Scale Mining*. Geneva: ILO.

——. 1999. *Social and Labour Issues in Small-scale Mines, Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale mines*. Geneva: ILO Sectoral Activities Programmes, International Labour Office.

International Council on Mining and Metals. 2015. *Mining in Ghana—what future can we expect? Mining: Partnerships for Development report*. London: International Council on Mining and Metals.

——. 2018. *Supporting the formalisation of artisanal and small-scale mining (ASM) in Peru*. Available at https://www.icmm.com/en-gb/case-studies/supporting-formalisation-of-artisanal-and-small-scale-mining-in-peru

Islamic Republic of Afghanistan. n.d. *Artisanal and Small scale Mining Policy*. Available at www.mom.gov.af/Content/files/Policies/English/English_ASM_Policy.pdf

ITSCI. 2018. *Understanding ITSCI.* Available at https://www.itsci.org/

Jennings, N. 1995. *Correspondence with UNDDSMS regarding Health and Safety in Small-scale mining*, 24 November 1995.

Kelly, L. 2018, February 2. Asia's Wealth Gap Is Amongst the Largest in the World: What Can Leaders Do to Fix It? *Forbes.* Available at www.forbes.com/sites/ljkelly/2018/02/02/asias-wealth-gap-is-among-the-largest-in-the-world-what-can-leaders-do-to-fix-it/#40c0307ea436

Kimberley Process Certification Scheme. 2018. Homepage. Available at https://www.kimberleyprocess.com/en

KPMG Global Mining Institute. 2016. *Peru Country Mining Guide*.

Labonne, B. 1994. Small- and medium-scale mining: The Harare seminar and guidelines. *Natural Resources Forum* 18 (1): 13-16.

Lahiri-Dutt, K. 2004a. Informal coal mining in Eastern India: Evidence from the Raniganj Coalbelt. *Natural Resources Forum* 27(1): 68-77.

——. 2004b. Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development. *Natural Resources Forum* 28(2): 123-132.

——. 2007. Roles and status of women in extractive industries in India: Making a place for a gender sensitive mining development. *Social Change* 37(4): 37-64.

——. 2008. Digging to survive: Women's livelihoods in South Asia's small mines and quarries. *South Asian Survey* 15(2): 217-244.

——. 2016. The diverse worlds of coal in India: Energising the nation, energising livelihoods. *Energy Policy* 99: 203-213.

——. 2017. Resources and the politics of sovereignty: The moral and immoral economies of coal mining in India. *South Asia: Journal of South Asia Studies* 40(4): 792-809.

Lahiri-Dutt, K., and Dondov, H. 2017. Informal mining in Mongolia: livelihood change and continuity in the rangelands. *Local Environment* 22(1): 126-139.

Lahiri-Dutt, K., and Roy Chowdhury, A. 2018. In the Realm of the Diamond King: Myth, Magic, and Modernity in the Diamond Tracts of Central India. *Annals of the American Association of Geographers* 108(6): 1620-1634.

Lakhani, S., and Corboz, J. 2017. *Illegal Mining in Afghanistan: A Driver of Conflict*. United States Peace Institute. Available at https://www.usip.org/publications/2017/07/illegal-extraction-minerals-driver-conflict-afghanistan

Law of Mongolia. 2006. *Law on Minerals (Revised Version).* Available at https://asmhub.mn/uploads/files/law-on-minerals.pdf

Lewis, D., and Franks, D. 2017. *Baseline Assessment of Development Minerals in Jamaica*. ACP-EU Development Minerals Programme and UNDP.

Low, P. 2012. *Artisanal and Small-scale Gold Mining in Peru: A Blessing or a Curse?* London: Peru Support Group.

Lowe, S. 2006. *Situation Analysis of the Small-Scale Gold Mining Sector in Guyana*. Georgetown, Guyana: World Wildlife Fund Guianas Regional Program.

Maconachie, R., and Binns, T. 2007. Beyond the resource curse? Diamond mining, development and post-conflict reconstruction in Sierra Leone. *Resources Policy* 32(3): 104-115.

Maldar, S. 2011. *Fairtrade and Fairmined Gold, Empowering responsible artisanal and small-scale miners*. A Fairtrade Foundation and Alliance for Responsible Mining Report.

MANAGEM. 2018. MANAGEM website. Available at http://www.managemgroup.com/

Martinelli, L. A., Ferreira, J. R., Forsberg, B. R., and Victoria, R. L. 1988. Mercury contamination in the Amazon: A gold rush consequence. Ambio 17(4): 252-254.

McQuilken, J. 2016. 'Ethical Gold' in sub-Saharan Africa: A Viable Empowerment Strategy? *International Development Planning Review* 38(2): 180-199.

——. 2018. *Small-scale mining and production networks in sub-Saharan Africa: reconceptualising a framework for 'pro-poor' ethical mineral certification*. PhD Thesis, Surrey Business School, University of Surrey. Available at http://epubs.surrey.ac.uk/848629/

McQuilken, J., and Hilson, G. 2016. *Towards Inclusive Formalisation of ASM in Ghana: Background research for and Action Dialogue*. London: IIED.

——. 2018. 'Mapping' Small-Scale Mineral Production Networks: The Case of Alluvial Diamonds in Ghana. *Development and Change* 49(4): 978-1009.

Medina, G. 2010, August 10. *Minería Artesanal e ilegal. Impactos económicos, sociales y ambientales* (Artisanal and illegal mining. Economic, social and environmental impacts). Lecture in La Paz, UNEP Peru—Bolivia Regional Project.

MEMSD. 2018a. *Mines and Hydrocarbons, Mining Sector 2014*. Available at http://www.mem.gov.ma/SitePages/IndicateursClesEn/DMHKeyMiningSector2014.aspx

——. 2018b. *Mines and Hydrocarbons, Artisanal, Restructuring of Artsinale Mining Activity.* Available at http://www.mem.gov.ma/SitePages/GrandChantiersEn/DMHMININGARTISANALEACTIVITY.aspx

——. 2018c. *Presentation of the national roadmap for the development of geological infrastructure and geothematic for the period 2015-2025*. Available at http://www.mem.gov.ma/SiteAssets/grandChantierEn/DG/NationalStrategy2015-2025.pdf

Mestre, I. 2017. When Shepherds Mine Mountains: The Impact of Artisanal Mining on Agropastoral Systems in Kyrgyztan. Case Study on Naryn Province. *Journal of Alpine Research* 105-1.

Meyer, R. F., and Carman J. (eds.). 1980.*The future of small scale mining: first international conference.* New York, NY: UNDP.

Mineral and Mining Industry in India. 2010. *India's mineral sector.* New Delhi: Mineral and Mining Industry in India.

Minerals Commission, Ghana. 2018. *Ghana Online Repository—Small-Scale Mining.* Accra, Ghana: Minerals Commission, Ghana and Revenue Development Foundation. Available at https://ghana.revenuedev.org/license

Ministerio de Energía y Minas. 2018. Ministry of Energy and Mines, Government of Peru. Available at www.minem.gob.pe

Ministry of Natural Resources Cooperative Republic of Guyana. 2018. Government website. Available at https://www.nre.gov.gy/mining/

MLNR. 2017. *Project Appraisal & Implementation Document for the Multilateral Mining Integrated Project (MMIP), June 2017.* Government of Ghana.

MMSD. 2000. *Mining, Minerals and Sustainable Development Budget Plan—1 October 2000.* London: IIED. Available at http://pubs.iied.org/pdfs/G00652.pdf

Moretti, D. 2006. The gender of the gold: An ethnographic and historical account of women's involvement in artisanal and small-scale mining in Mount Kaindi, Papua New Guinea. *Oceania* 76(2): 133-149.

MRPAM. *Annual Report 2016, Geology, Mining, Petroleum, Heavy Industry*. Available at https://www.mrpam.gov.mn/public/pages/66/MPRAMreport2016EN.pdf

Mukhopadhaya, P., and Lahiri-Dutt, K. 2014. Women as marginal workers in informal mining and quarrying, India: A preliminary analysis. *Journal of the Asia Pacific Economy* 19(2): 290-309.

Mustapha, Z., and Michae, A. 2013. Earthen Construction, as a Solution to Building Industries in Ghana. *Journal of Economics and Sustainable Development* 4(3): 190-198.

Noetstaller, R. 1987. *Small-Scale Mining, A Review of the Issues.* World Bank Technical Paper Number 75, Industry and Finance Series. Washington, D.C: The World Bank.

Norton Rose Fulbright. 2018. *Middle East, North Africa and Central Asia (MENACA)—Mining guides (Jordan and Oman)*. Available at http://www.nortonrosefulbright.com/knowledge/publications/79893/middle-east-north-africa-and-central-asia-menaca-mining-guides

NSO. 2016. *Artisanal and S[m]all-scale miners' survey summary.* NSO and SDC.

——. 2017. *Artisanal and Small-Scale Miners' Survey Report—2016.* NSO and SDC.

The Observatory of Economic Complexity. 2018a. *Ghana, Export Visualization*. Available at https://atlas.media.mit.edu/en/profile/country/gha/

——. 2018b. *Peru, Export Visualization*. Available at https://atlas.media.mit.edu/en/profile/country/per/

——. 2018c. *Morocco, Export Visualization*. Available at https://atlas.media.mit.edu/en/profile/country/mar/

OECD. 2013. *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas* (second edition). Paris: OECD Publishing. Available at http://dx.doi.org/10.1787/9789264185050-en

Olivero, J., Mendonza, C., and Mestre, J. 1995. *Hair mercury levels in different occupational groups in a gold mining zone in the north of Colombia*.

Opoku-Antwi, G. Amofah, K., and Koffuor, K. 2012. Comparative Study in the Bibiani, Bolgatanga, Dunkwa and Tarkwa Mining Districts of The Minerals Commission of Ghana. *Journal of International Energy Policy* 1(1): 19-34.

Pasha, S., Wenner, M. D., and Clarke, D. 2017. *Toward Greening of the Gold Mining Sector in Guyana, Transition Issues and Challenges*. Inter-American Development Bank.

Pfeiffer, W. C., and de Lacerda, L. D. 1988. Mercury inputs into the Amazon Region, Brazil. *Environmental Technology Letters* 9(4): 325-330.

Rudestam, K. E., and Newton, R. R. 2007. *Surviving Your Dissertation: A Comprehensive Guide to Content and Process* (third edition). Thousand Oaks, CA, USA: SAGE Publications.

Salo, M., Hiedanpaa, J., Karlsson, T., Carcamo Avila, L., Kotilainen, J., Jounela, P., and Rumrrill Garcia, R. 2016. Local perspectives on the formalization of artisanal and small-scale mining in the Madre de Dios gold fields, Peru. *The Extractive Industries and Society* 3(4): 1058-1066.

Samal, K. C., and Mishra, S. 1998. Migrant workers in a coal mine region of Orissa. *Indian Journal of Labour Economics* 41(4): 745-754.

Sanborn, C. A., Ramirez, T., and Hurtado, V. 2017. *Mining, political settlements and inclusive development in Peru.* ESID Working Paper No. 79. Available at http://www.effective-states.org/wp-content/uploads/working_papers/final-pdfs/esid_wp_79_sanborn_ramirez_hurtado.pdf

Saunders, M., Lewis, P., and Thornhill, A. 2012. *Research Methods for Business Students* (sixth edition). Harlow, London: Pearson.

SDC. 2015. *Baseline Study on the Value of Investment Made by Miners and Traders into Local Economic Sector and Their Contribution to Economic Growth*.

Seccatore, J., Veiga, M., Origliasso, C., Marin, T., and De Tomi, G. 2014. An estimation of the artisanal small-scale production of gold in the world. *Science of the Total Environment* 496: 662-667.

Securities and Exchange Commission. 2012. Conflict Minerals—Final Ruling. SEC 17 CFR Parts 240 and 249b. (Release No. 34-67716; File No. s7-4-10).

SES Professionals. 2018. *Overview of Mongolia's Mining Industry*. Available at http://sesprofessionals.com/overview-of-mongolias-mining-industry/

Shen, L., and Gunson, A. 2006. The role of artisanal and small-scale mining in China's economy. *Journal of Cleaner Production* 14(3-4): 427-435.

Statistica. 2018. *Annual average gold price from 1900 to 2017 (in U.S. dollars per troy ounce)*. The Statistics Portal. Available at https://www.statista.com/statistics/268027/change-in-gold-price-since-1990/

Steckling, N., Boese-O'Reilly, S., Gradel, C., Gutschmidt, K., Shinee, E., Altangerel, E., Badrakh, B., Bonduush, I., Surenjav, U., Ferstl, P., Roider, G., Sakamoto, M., Sepai, O., Drasch, G., Lettmeier, B., Morton, J., Jones, K., Siebert, U., and Hornberg, C. 2011. Mercury exposure in female artisanal small-scale gold miners (ASGM) in Mongolia: An analysis of human biomonitoring (HBM) data from 2008. *Science of the Total Environment* 409(5): 994-1000.

Sustainable Artisanal Mining Project. 2018. Home Page. Available at http://sam.mn/

Tarras-Wahlberg, N. H., Flachier, A., Lane, S. N., and Sangfors, O. 2001. Environmental impacts and metal exposure of aquatic ecosystems in rivers contaminated by small scale gold mining: The Puyango River basin, southern Ecuador. *Science of the Total Environment* 278(1-3): 239-261.

Tata Energy Research Institute. 2001. *Overview of Mining and Mineral Industry in India*. London: MMSD and IIED.

The Ghana Chamber of Mines. 2017. *Performance of the Mining Industry in 2016*.

——. 2018. *Performance of the Mining Industry in 2017*.

U.K. Department for International Development. 2004. *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector—An Overview*. Centre for Development Studies, University of Wales Swansea, and U.K. Department for International Development.

UNDESA. 1972. *Small Scale Mining in the Developing Countries*. UNDESA Resources and Transport Division.

——. 2003. *Poverty Eradication & Sustainable Livelihoods: Focusing on Artisanal Mining Communities*. New York and Geneva: UNDESA.

UNDP. 2018a. *Financing the Sustainable Development Goals in ASEAN: Strengthening integrated national financing frameworks to deliver the 2030 Agenda. New York: United Nations Development Program.*

——. 2018b. Human Development Indices and Indicators: 2018 Statistical Update. Available at http://hdr.undp.org/en/2018-update

UNDP, UN Habitat, and Global Taskforce of Local and Regional Governments. 2016. *Roadmap for Localizing the SDGs: Implementation and Monitoring at Subnational Level*.

UNECA. 2011. *Minerals and Africa's development: The International Study Group Report on Africa's Mineral regimes*. Addis Ababa: UNECA.

——. 2018. *Morocco ASM Profile*. Available at http://knowledge.uneca.org/ASM/morocco

UNEP. 2012. *Analysis of formalization approaches in the artisanal and small-scale gold mining sector based on experiences in Ecuador, Mongolia, Peru, Tanzania and Uganda*. Geneva: UNEP.

——. 2017. *Minamata Convention on Mercury, Text and Annexes*. Geneva: UNEP. Available at http://www.mercuryconvention.org/Portals/11/documents/Booklets/COP1%20version/Minamata-Convention-booklet-eng-full.pdf

United Nations. 1996. Recent developments in small-scale mining. *Natural Resources Forum* 20(3): 215-225.

——. 2018. *The Sustainable Development Goals Report 2018*.

Université du Québec à Montréal. n.d. *Baseline Survey of Small-Scale Mining in Kyrgyz Republic*.

USBM. 1982. *An Assessment of Factors Affecting Small Mining and Custom Milling and Smelting Operations in the Western United States*.

U.S. National Parks Service. 2017. *World Physical Map*. Esri. Available at https://www.arcgis.com/home/item.html?id=c4ec722a1cd34cf0a23904aadf8923a0

USGS. 2010a. *Major (mineral) deposit dataset, 2010*. Available at https://www.usgs.gov/energy-and-minerals/mineral-resources-program/science/usgs-mineral-deposit-database?qt-science_center_objects=0#qt-science_center_objects

——. 2010b. *MRDS Dataset, 2010*. Available at https://mrdata.usgs.gov/mrds/

——. 2018. *Mineral Resources Data System*. Available at https://mrdata.usgs.gov/mrds/

Walrond, G. W., Heesterman, L. J. L., and Goolsarran, J. 2015. *Guyana Geology and Mines Commission Management and Systems Review* (Inception Report). Georgetown, Guyana: Mines Division, Land Management Division, and Geological Services Division.

Willis, K. 2011. *Theories and practices of development, perspectives on development*. Oxon: Routledge.

World Atlas. 2017. *List of Countries by Fluorite Production*. Available at https://www.worldatlas.com/articles/list-of-countries-by-fluorite-production.html

World Bank. 1992. *A Strategy for African Mining*. Washington, D.C.: World Bank.

——. 2007. *Poverty headcount ration, Morocco*. World Bank national accounts data and OECD National Accounts data files. Available at https://data.worldbank.org/indicator/SP.POP.TOTL?locations=MA

——. 2011. *Poverty headcount ratio, India*. World Bank national accounts data and OECD National Accounts data files.

——. 2012. *Poverty headcount ratio, Ghana*. World Bank national accounts data and OECD National Accounts data files. Available at https://data.worldbank.org/indicator/SI.POV.NAHC?locations=GH

——.2015. Socioeconomic Impact of Mining on Local Communities in Africa. Report no. ACS14621. Africa: World Bank Group.

——. 2017a. *Atlas of Sustainable Development Goals 2017: From World Development Indicators*. Washington, D.C.: World Bank.

——. 2017b. World Bank national accounts data, and OECD National Accounts data files. Available at https://data.worldbank.org/

——. 2018a. *Atlas of Sustainable Development Goals 2018: World Development Indicators*. Washington, D.C.: World Bank. doi: 10.1596/978-1-4648-1250-7

——. 2018b. *The World Bank Atlas method—detailed methodology*. Washington, D.C.: World Bank. Available at https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-the-world-bank-atlas-method-detailed-methodology

——. 2018c. *GNI per capita, Atlas method (current USD)*. World Bank national accounts data and OECD National Accounts data files. Available at https://data.worldbank.org/indicator/NY.GNP.PCAP.CD

——. 2018d. *The World Bank in East Asia and Pacific*. Available at www.worldbank.org/en/region/eap

——. 2019. *Forest Smart Mining to Advance the New York Declaration on Forests and Sustainable Development Goals*. Accessed at https://www.worldbank.org/en/events/2018/08/24/forest-smart-mining-to-advance-the-nydf-and-sdgs

Xing, M., Awuah-Offei, K., Long, S., and Usman, S. 2017. The effect of local supply chain on regional economic impacts of mining. *The Extractive Industries and Society* 4(3): 622-629.

Yakovleva, N. 2007. Perspectives on female participation in artisanal and small-scale mining: a case study of Birim North District of Ghana. *Resources Policy* 32(1-2): 9-41.

Yumang, A. P., Makalinao, I. R., Cortes-Maramba, N. P., and Rivera, A. T. F. 2003. Health and environmental assessment from mercury exposure among gold miners in Compostela valley province, Philippines. *Journal De Physique IV* 107: 1399.

Zevallos, O. 2013. *Invisible and informal: women artisanal gold miners*. Available at http://perusupportgroup.org.uk/article-640.html